Graduate School of Business

Factors Affecting the Adoption and Practice of Knowledge Management in the Life Insurance Industry in Taiwan

Li-Su Huang

This thesis is presented for the Degree of
Doctor of Philosophy
of
Curtin University of Technology

August 2007

Declaration

To the best of my knowledge and belief this thesis contains no material previously published by any other person except where due acknowledgement has been made.

This thesis contains no material which has been accepted for the award of any other degree or diploma in any university.

Signature: ……..

Date: ……

Abstract

In the trend of globalization and coordination of banks, insurance and security companies, Taiwan life insurance industry has been facing tremendous competitive pressure. As a result of the shift from focusing on tangible resources to intangible resources, enterprises are seeking for gaining more and more competitive advantages through managing and maximizing their most valuable asset, i.e., knowledge. While knowledge management (KM) has been used and operated in the business world for decades, its applications, which involve recognition of knowledge, development of information system and support of organization, have just been initiated in Taiwan life insurance industry recently. The issues of knowledge management have been discussed widely by a number of researchers. However, there is a genuine lack of knowledge management adoption and practice model for the life insurance industry. This study addresses this research gap via conducting empirical surveys with an embedded qualitative field study among the life insurance enterprises in Taiwan. The research aims to examine the value of knowledge, perception of knowledge management and the factors of knowledge management adoption and practice in the context of Taiwan life insurance industry.

The research was carried out in three main phases. In the first phase, a tentative research model was developed through a comprehensive literature review. A qualitative field study was then undertaken to fine-tune the research model. Six life insurance companies participated in the field study, resulting in ten interviews with key persons in the companies. A semi-structured interview protocol was used to collect the data. Via the procedures of content analysis, twelve factors and ninety-three variables were identified from the field study. The combined research model was thus developed by incorporating the results from the field study and the tentative research model which was proposed based on the extensive literature review.

In the second phase, a questionnaire was developed, according to the combined

research model. The research instrument was pilot tested by surveying several managers and staff in a life insurance company in Taiwan. The findings from the empirical pilot survey indicated that the research instrument was relatively reliable. However, some minor amendments were made based on the feedback from pilot test.

In the third phase, a nation-wide main survey was administered among 605 managers and staff within different departments and sections in the life insurance companies in Taiwan. 362 valid responses were collected in this phase which yielded a 59.8% effective response rate. The national survey data were analyzed using Partial Least Squares (PLS) based Structural Equation Modeling technique.

The findings revealed that "environments and industrial factors", "knowledge management promotion" as well as "cultural factors" significantly influenced the "perceived usefulness" of knowledge management. However, the effect of the "complexity" concerning knowledge management on employees' attitudes toward its adoption was found to be insignificant in this study. It was "individual characteristics", "perceived usefulness" and "subjective norm" that significantly influenced the employees' attitudes toward knowledge management adoption. It thus implied that the employees would attempt to overcome the difficulties involved in knowledge management as it was perceived useful for them and there was an environment in which knowledge management activities were valued and encouraged. Moreover, the results indicated that "attitude toward KM adoption" significantly influenced knowledge management practice, which in turn affected the perceived performance of the organization.

The research model well explained how knowledge management was adopted and applied in Taiwan life insurance enterprises. This study thus contributes significantly to the existing literature since there was little research available in investigating life insurance enterprises' adopting and applying knowledge management. In the meantime, the findings of this study also provide managerial implications to the life insurance business, particularly that embarking on knowledge management in Taiwan. Finally, the applications of this study can be extended through further adaptation in other financial industries and various geographic contexts.

Acknowledgement

I would like to express my deepest thanks to my supervisor, Professor Mohammed Quaddus, for his excellent supervision, guidance and support. His professionalism, dedication and patience have contributed greatly not only to the completion of my thesis, but also to the development of my readiness and passion for future research. Besides, I am so grateful to my co-supervisor, Dr. Anna Rowe, for her direction, assistance and encouragement all the way during the thesis.

Many thanks are also due for my friends, fellow postgraduate students and graduates who supported me during my research. To name a few, I wish to give warmest thanks to Jessie, Ray, Alex, Amy, Paul, Daphne, Azizah, Shakizah, Elizabeth, Dr. Jun Xu and Dr. William Lee for their friendship and kind assistance during my difficult times. Acknowledgement is also made for Curtin Business School, Graduate School of Business and the staff for their provision of knowledge, support and facilities. Special appreciation goes to Ms. Jo Boycott and Ms. Marilyn Green for their caring and helps during my stay at Curtin. I sincerely extend my thanks to the participants of the field study and the respondents in both pilot and main surveys since the research would not have been possible without their valuable input.

To my parents and parents-in-law, thank you for your love and sacrifice for me to pursue the wealth of knowledge. Finally, very special recognitions go to my husband, Cheng-Po, and my children, Sheanna and Ting, who have provided me with the most patience, affection and support, allowing me to go for the advanced study and fulfill my dream in life.

Table of Content

List of Tables

List of Figures

Chapter 1 INTRODUCTION AND OVERVIEW

1.1 Introduction

This study investigates the factors affecting the adoption and practice of knowledge management (KM) in the life insurance industry in Taiwan. A mixed methodology approach is used in this study. The research was carried out in three phases: field study, pilot survey and main survey. The data collected from the main survey among Taiwan life insurance enterprises were analyzed through Partial Least Squares (PLS) techniques (Barclay, Higgins & Thompson 1995; Chin 1998; Santosa, Wei & Chan 2005).

This chapter presents an overview of the research background, questions, objectives and significance of this study, as well as the structure of the thesis.

1.2 Background

1.2.1 Knowledge Economy and Knowledge Management

In the increasingly competitive environment, knowledge management has become

the primary issue for organizations to effectively enhance their competency. As a result of the changing market places in which capital assets market have been replaced by knowledge economy, organizations have initiated to recognize the value of knowledge-based assets and paid more attention to manage these assets (Alavi & Leidner 2001). The assets associated with knowledge are suggested to be the base of sustainable competitive advantages and foundation of business success in the twenty-first century (Wiig 1997). Organizations have been realizing that knowledge is the most important source of wealth and basic economic resource in the contemporary society, i.e., knowledge society (Drucker 1993). Davenport, DeLong and Beers (1998) indicate that, when organizations face the competitors that operate well in areas such as marketing, structure, product design and customer service, effective knowledge management may be the only weapon to win the competition.

Knowledge and intellectual capital, referred as the intangible resources, are proposed to be sources of production and value for organizations, while tangible assets such as land, plant and equipment can hardly serve as the resources that create the organizations' competitive advantages (Carlsson 2001; Clarke & Turner 2004; Davenport & Prusak 1998; Drucker 1993; Nonaka & Takeuchi 1995; Sveiby 1997; Wiig 1993). Wiig (1999) maintains that an organization can act intelligently to sustain its long-term competitive advantages via developing, building and organizing its knowledge assets. The study of International Data Corporation showed several gains from knowledge management. The examples included that BP brought US $ 260 million to bottom line-documented savings attributed to knowledge management, Buckman Labs had increased in its new-product sales by 50%, the Dow Chemical Company saved US $40 million a year in the re-use of patents, Ford Motor Company saved more than US $ 600 million in three years, Hewlett-Packare reduced cost by 50%, Rank Xerox reduced its dispatches by 15%, Roche sent out its products for FDA approval six months faster, Sequent registered 10% higher sales for new sales representatives after six months, among many others (The Conference Board 1999). However, with the lack of tools and processes of capturing, connecting and leveraging organizational expertise, some knowledge would turn to be incorrect or obsolete year by year while other would become unavailable for the causes of employee turnover, mismanagement of information or hoards of knowledge

(Wareham 1999). The Cathay Life Insurance Company, ranking number one in Taiwan lie insurance industry, recognized its crisis for loosing capability to react to the transformation in the knowledge economy (Microsoft, Taiwan 2005). Initiated by the Cathay Life Insurance Company, the life insurance enterprises in Taiwan shifted their focus on knowledge related resources and put more efforts in the management of knowledge to generate their competitive competency in the emerging global information economy.

1.2.2 Taiwan Life Insurance Industry

Up to 2005, the population of household registered in Taiwan was 22.770 million and the ratio of life insurance policies to population was 1.76% (Taiwan Insurance Institute 2006). The life insurance industry has been growing exponentially and playing an important role in the financial industries in Taiwan. The total assets of Taiwan life insurance industry in 2005 was NT$ 6,573,797 million, which was 17.50% of the total assets of financial institutions in Taiwan. According to the *Insurance Law* in Taiwan, the life insurance industry can operate life insurance, accident insurance, health insurance and annuities for both individuals and groups. The life insurance policies provided people with protection and financial reimbursement when death, accidents or diseases occur. Thus, the people living in a highly-condensed environment such as Taiwan have gradually acknowledged the concept and need of life insurance products. In 1996, the total premium income of Taiwan life insurance industry was only NT$ 358,415 million (Taiwan Insurance Institute 2006). However, the life insurance enterprises in Taiwan added their premium income NT$ 1 billion more than ten years ago and reached NT$ 1, 457,632 million in 2005 (Taiwan Insurance Institute 2006), which was approximately AU$ 48,848 million with the exchange rate that NT$ 29.84 was equal to AU$ 1.00 (Bank of Taiwan 2007). The increase of premium income among the life insurance business in Taiwan over the last ten years is presented in Table 1.1 (Taiwan Insurance Institute 2006).

Table 1-1 Statistics of Taiwan Life Insurance Premium Income

Year	Premium income (Unit: NT$ Million	Individual				Group		
		Life	Health	Accident	Annuity	Life	Health	Accident
1996	358,415	296,042	23,894	27,961	-	3,610	2,782	4,126
1997	422,618	346,086	32,888	31,896	-	3,947	2,926	4,875
1998	489,220	394,130	44,089	37,023	341	4,378	2,960	6,299
1999	558,074	444,370	58,406	40,045	772	4,638	3,111	6,732
2000	626,317	486,324	79,124	44,545	559	5,576	2,958	7,231
2001	728,891	561,967	96,876	47,921	3,933	7,114	3,432	7,648
2002	889,287	692,725	107,713	51,936	16,724	6,861	5,638	7,690
2003	1,132,652	864,722	120,321	52,045	73,617	6,837	5,601	9,509
2004	1,308,486	948,119	134,237	48,703	155,003	6,896	6,341	9,187
2005	1,457,632	1,120,367	143,730	49,046	121,010	6,803	7,230	9,445
Note: NT$ 29.84 = AU$ 1.00 (Bank of Taiwan 2007)								

Source: Taiwan Insurance Institute (2006)

However, the life insurance industry in Taiwan has been facing tremendous competitive pressure in the trend of globalization, particularly since 2002 when Taiwan officially became a member of the World Trade Organization (WTO). The Ministry of Finance (MOF) took initiatives in a variety of rules to enable the life insurance companies to enter the global market and advance the modernization of Taiwan life insurance market. The government actively regulated the operation of the life insurance business through several initiatives, such as amending insurance regulations, employing more supervision on insurance agents, brokers and surveyors, as well as implementing information disclosure clause to protect the rights of customers. In the ever-changing global economic situation, the life insurance industry in Taiwan strived to enhance competitiveness through providing quality services, reinforcing information systems, applying innovative strategies and re-create the business value of the company from its internal resources (Lu 2002).

The life insurance industry can be seen as an example of a knowledge-based industry.

It typically sells life insurance contracts, which are piece of papers with the promises that professional knowledge and service will be provided by the life insurance companies (Hsiao 2003). Nonetheless, increasing problems have occurred among the life insurance companies in Taiwan. The problems include numerous documents, increasing products (i.e. new policies) and various customer demands with the requirement of rapid and correct services. The management of knowledge to enhance service quality and performance becomes an indispensable choice for the life insurance companies to gain competitive advantages (Wang 2005). Although the life insurance industry is regarded in Taiwan as a traditional industry with long history, it is believed that the knowledge embedded in the life insurance companies can be well explored via promotion of knowledge management (Wang 2005). Through knowledge management activities such as contributing, storing, sharing, applying and reusing knowledge, the knowledge assets of organizations could be retained intact (Wang 2005). As a result, the employee could get access quickly to useful information and knowledge required, and the original costs associated with transmitting documents are thus reduced.

1.3 Research Questions

Building on the resource-based theory, a knowledge-based perspective of organizations has emerged in the management literature in 1990s (Cole 1998; Nonaka & Takeuchi 1995; Spender 1996). Resource-based model (Barney 1986; 1997; Mata, Fuerst & Barney 1995) emphasizes a firm's internal resources, which consist of both tangible and intangible assets. It highlights that these resources need to be mobilized and managed better for sustained competitive advantages. The knowledge-based perspective suggests that the services rendered by tangible resources depend on how they are combined and applied, which is a function of the firm's know-how (i.e., knowledge). The knowledge is carried through organization systems, routines, policies, document and employees (Grant 1996; Spender 1996). Because knowledge-based resources are usually difficult to imitate and socially complex, they are viewed as the resources which may create long-term sustainable competitive advantages (Alavi & Leidner 2001). However, hoards of information are of little value; only actively acquiring, organizing and applying it (i.e., knowledge management) can create and sustain competitive advantages (Alavi & Leidner 1999).

Given the fact that knowledge management is broadly applied in organizations (Alavi & Leidner 2001; Bonner 2000; Chou 2001; Lin 2001; Wang 2004; Wang, Tsai-Pai 2002; Wu, Chia-Chun 2004; Wu, Hui-Hsuan 2004), the adoption and applications of knowledge management have not been well explored by researchers empirically in the life insurance industry. Accordingly, this study attempts of fill this gap by examining the value of knowledge management and the factors influencing its acceptance and applications in the life insurance industry in Taiwan. Accordingly, the research questions of this study are as follows:

Q.1: What are the factors affecting knowledge management adoption and practice in the life insurance industry in Taiwan?

Q.2: How are the factors perceived to affect knowledge management adoption and practice in the life insurance industry in Taiwan?

1.4 Research Objectives

This study aims to address the research questions above via the following research objectives:

1. To identify the factors for or against knowledge management adoption and practice in the life insurance industry in Taiwan.
2. To examine how the factors affect knowledge management adoption and practice in this context.
3. To investigate how knowledge management is perceived to affect the performance of the organization in this context.

1.5 Significance

The significance of this study lies in its theoretical and practical contributions as follows:

As mentioned before, though the topic of knowledge management has been widely discussed by scholars, little knowledge management research has been conducted among the life insurance enterprises. The applications of knowledge management

have been shown to provide advantages in various industries, such as the high-tech industry in Taiwan (Chou 2001). Exploring the value of knowledge management, identifying the associate factors and how they affect the adoption and practice of knowledge management for the life insurance business will contribute to the existing literature and provide directions for future research.

From the practical perspective, the results and findings of this study will provide a better understanding of the determinant factors of knowledge management in the life insurance industry, and guidelines to help life insurance enterprises succeed in adopting and implementing knowledge management. In addition, since this study will be undertaken in Taiwan, a significant contribution will be made to Taiwan life insurance industry, which will find this study extremely useful to embark on knowledge management adoption and application.

1.6 Structure of Thesis

The thesis is structured into ten chapters, with this chapter providing an overview of this study and an outline for the later chapters. The remainder of this thesis is organized as follows. Chapter Two reviews the relevant literature and theoretical backgrounds which underline the current study. Firstly, different perspectives and classifications pertaining to knowledge and its management, the resource-based view, as well as the principles of successful knowledge management are described. The next sections present the theoretical background in which the Theory of Reasoned Action (Ajzen & Fishbein 1980), Technology Acceptance Model (Davis 1986) and Innovation Diffusion of Rogers (1995) are discussed. The relevant studies that are extended from these theories are also reviewed. The review indicates the lack of literature on the adoption and diffusion of knowledge management and thus highlights the significance of this study.

Chapter Three describes the Taiwan life insurance sector environment and the empirical studies regarding knowledge management in Taiwan. The initial section presents the evolution of the life insurance business and its role in the financial industries in Taiwan. This is followed by an investigation into the previous studies that discuss the applications of knowledge management in various industries in the

setting of Taiwan. The necessity of knowledge management for the life insurance industry is depicted and the research examining employees' thoughts as to accepting and implementing knowledge management is found to be relatively deficient.

Chapter Four, based on the background theories and relevant studies described in the earlier chapters, presents the conceptual framework of this study. The tentative research model is hence proposed with its development and related references discussed in detail. Finally, the operational definitions of the terms used in the tentative research model are provided.

Chapter Five presents the research methodology and design of this study. The opening section discusses the research paradigm. The next section describes the mixed research methods that apply both qualitative and quantitative techniques in this study. This is followed by the presentation of research process, comprising three main stages, namely, field study, pilot test and national main survey. The approaches of sample selection, data collection and data analysis for each stage are discussed separately. Other research method issues such as the impact of culture involved in international research are also provided.

Chapter Six details the operation of the field study. Following a brief description of the demographic information of the interviews, the factors and variables along with the associated linkages among the factors identified from the field study are presented. Drawing on the results of the qualitative field study and the literature, the combined research model is thus developed. This chapter concludes with a comprehensive description of the factors and variables of the final research model.

Chapter Seven describes the suggested hypotheses and questionnaire development in this study. Details of the proposed hypotheses are provided in the first section. This is followed by the presentation of the instrument developed and the reference sources of the measurement items. The procedures of back translation and pretest are also provided in this chapter. Finally, this chapter presents the empirical pilot study and its reliability testing that further validates the research instrument.

Chapter Eight presents the administration of the nation-wide main survey and its results via Partial Least Squares (Barclay, Higgins & Thompson 1995; Chin 1998; Santosa, Wei & Chan 2005) analysis techniques. The initial section described the demographic characteristics of the respondents in the main survey. The next section explains the data analysis procedures using Partial Least Squares. This is followed by a detailed presentation of the measurement model evaluation assessing item reliability, internal consistency and discriminant validity. The structural model assessment is then presented through obtaining the R-square values and identifying the significance of paths among constructs. Lastly, the results of hypothesis testing are provided.

Chapter Nine further presents the findings of the PLS results by discussing the eighteen hypotheses proposed in Chapter Seven and tested in Chapter Eight. Theoretical and practical implications from these results are provided in this chapter.

In conclusion, Chapter Ten summarizes the research, highlights the significance of the results, discusses the limitations of this study and suggests future research directions.

1.7 Summary

The research on knowledge management has grown distinctly over the last decades. Viewing knowledge as essential resources of organizations, it requires to be well integrated and managed to create sustained competitive advantages. While the business world has embraced the applications and use of knowledge management widely, the same is not true for the life insurance industry in Taiwan and there is a genuine lack of knowledge management adoption and practice model in the setting of life insurance business in general.

With the main task of providing professional knowledge and services, the life insurance industry can be observed as a knowledge-based industry. Adopting knowledge management and applying knowledge management activities are considered to be valuable for life insurance enterprises to enhance their competitive competency. The life insurance industry has been playing a significant role in the

financial industries in Taiwan. The total assets and income from premiums of Taiwan life insurance industry in the recent years have increased exponentially. Therefore, this study seeks to explore the worth of knowledge management and the related factors that affect the acceptance and implementation of knowledge management in Taiwan life insurance industry. Besides, the results of this study are expected to facilitate life insurance organizations, particularly those enterprises embarking on knowledge management in Taiwan, to help develop better knowledge management initiatives and apply knowledge management successfully.

Chapter 2 LITERATURE REVIEW

2.1 Introduction

This chapter aims to present the theoretical foundation for the current study. As identified in Chapter 1, little research is found to be available for investigating the adoption and applications of knowledge management in the life insurance sector. However, there have been a number of studies regarding knowledge and its management, as well as the acceptance and implementation of new technologies or other innovations. Reviews and summaries of these studies can enlighten the understanding of knowledge management adoption and practice among the life insurance enterprises.

This chapter is organized as follows. First, definitions and general categories of knowledge and knowledge management are presented. This is followed by an examination of the key elements of effective knowledge management and potential obstacles in managing knowledge in organizations. Next, in order to provide a theoretical background for developing the research framework according to the research objectives of the current study, three primary theories that underline the causes and relations between people's perceptions and innovation adoption/diffusion are presented. The main theories applied in this study are the Theory of Reasoned Action (TRA) (Ajzen & Fishbein 1980), Technology Acceptance Model (TAM)

(Davis 1986) and Innovation Diffusion (ID) (Rogers 1995). The TRA and TAM models provide the bases of explanation as regards to the adopters' attitudes, beliefs and actual use of new technologies involved in knowledge management. The suggestions of ID are employed to discuss why and how new ideas and practices are accepted and disseminated in organizations.

2.2 Knowledge and Knowledge Management

2.2.1 Knowledge

2.2.1.1 Definition of knowledge

Concepts and practices evolved through the 1990s realized that knowledge was perhaps the critical resource, compared to land, machines or capital (Drucker 1993; Earl 2001). The nature of knowledge has been described as "justified true belief" (Nonaka & Takeuchi 1995). Nonetheless, definitions of knowledge in organizational context range from "complex, accumulated expertise that resides in individuals and is partly of largely inexpressible" to "much more structured and explicit content" (Becerra-Fernandez & Sabherwal 2001; Davenport & Prusak 1998). Earl (2001) indicates that it is difficult to define knowledge itself and knowledge management since theoretical insights into how knowledge might be managed have come from various disciplines such as sociology (Polanyi 1966), economics (Silberston 1967), philosophy and epistemology (Kuhn 1970), as well as computer science (Hayes-Roth, Waterman & Lenat 1983).

However, recognizing knowledge is crucial for effective knowledge management (Allee 1998). According to Davenport and Prusak (1998), knowledge is a fluid of framed experience, values, contextual information and expert insight that provides a framework for evaluating and incorporating new experiences and information. Knowledge originates and is applied in the minds of knowers. In organizations, knowledge is often embedded not only in documents or repositories, but also in organizational routines, processes, practices and norms. Moreover, Bollinger and Smith (2001) define knowledge as "the understanding, awareness, or familiarity acquired through study, investigation, observation, or experience over the course of

time"; that is, knowledge is an individual's interpretation of information based on personal experiences, skills and competencies. For example, in the case of life insurance business, "knowledge" might constitute the familiarity and professional capability in underwriting, claim, customer service, etc.

Knowledge can also be viewed from several perspectives (Alavi & Leidner 2001). The alternative perspectives on knowledge and their implications for knowledge management are summarized in Table 2-1.

Table 2-1 Alternative Perspectives on Knowledge and Their Implications for Knowledge Management

Perspective on Knowledge		**Implication for Knowledge Management**
State of mind	Knowledge is the state of knowing and understanding gained through experience or study; knowledge is the sum or range of what has been perceived, discovered, or learned (Schubert, Linche & Schmid 1998)	Knowledge management involves enhancing individual's learning and understanding through provision of information.
Object	Knowledge is an object to be stored and manipulated (Carlsson et al. 1996; McQueen 1998; Zack 1998a).	Main issue of knowledge management is building and managing knowledge stocks.
Process	Knowledge is a process of simultaneously knowing and acting (Carlsson et al. 1996; McQueen 1998; Zack 1998a).	Knowledge management focus is on knowledge flows and the process of creation, sharing and distributing knowledge.
Access to information	Knowledge is a condition of access to information	Knowledge management emphasis is organized access to

	(McQueen 1998).	and retrieval of content.
Capability	Knowledge is a capability with potential for influencing future action (Carlsson et al. 1996); knowledge is the capability to use information (Watson 1999).	Knowledge management is about building core competencies, understanding strategic advantage of know-how and creating intellectual capital.

(Adapted from Alavi & Leidner 2001)

The perspective on knowledge as a state of mind focuses on enabling individuals to expand their personal knowledge and apply it to the organization's needs. The second view defining knowledge as an object emphasizes that knowledge should be well stored and manipulated. Thirdly, the process perspective focuses on applying expertise. According to the fourth perspective that knowledge is a condition of access to information, organizational knowledge should be organized to facilitate access to and retrieval of content. The capability perspective emphasizes that learning and experience result in an ability to interpret information and to ascertain what information is necessary in decision making (Alavi & Leidner 2001). The first two perspectives (i.e., state of mind and object) put more attention to the static aspects of knowledge, while the last three perspectives view knowledge from a more dynamic way and suggest that managing knowledge is to create, share and distribute knowledge, to organize the access to information, to build core competencies, as well as to realize the strategic advantage of know-how and creating intellectual capital. This study takes the capability perspective that knowledge is a capability with potential for influencing future action (Alavi & Leidner 2001; Carlsson et al. 1996).

Knowledge for an organization includes the following main characteristics (Wiig, de Hodg & van der Spek 1997):

1. Knowledge is intangible and difficult to measure;
2. Knowledge is volatile;
3. Knowledge is, most of time, embodied in agents with wills;
4. Knowledge is not "consumed" in process and it sometimes increases through use;

5. Knowledge has wide ranging impacts in organizations (e.g. “knowledge is power”); and
6. Knowledge cannot be bought on the market at any time as it often has long lead times.

Nowadays, the discussion of knowledge has quickly led to the issue regarding how knowledge is defined. A pragmatic definition defines knowledge as the most valuable form of content in a continuum starting at data, encompassing information and ending at knowledge (Grover & Davenport 2001). According to Grover and Davenport (2001), data is classified, summarized, transferred or corrected in order to add value, and become information within a certain context. This conversion is relatively mechanical and has long been facilitated by storage, processing and communication technologies. Consequently, these technologies add place, time and form utility to the data and the information serves to “inform” or reduce uncertainty within the problem domain.

Some researchers, mostly in the information technology literature, address the question of defining knowledge by differentiating knowledge from data and information (Alavi & Leidner 2001). Davenport and Prusak (1998) indicate that knowledge is nor data nor information, and it is important to emphasize that data, information and knowledge are not interchangeable concepts, despite that they are related to one another. Data and information are constantly transferred electronically, whereas knowledge seems to travel most felicitously through a human net work (Davenport, DeLong and Beers 1998). McDermott (1999) proposes that knowledge distinguishes from information in the following aspects:

1. Knowledge is a human act.
2. Knowledge is the residue of thinking.
3. Knowledge is created in the present moment.
4. Knowledge belongs to communities.
5. Knowledge circulates through communities in many ways.
6. New knowledge is created at the boundaries of old.

Brooking (1999) suggests that data are factors, pictures, number-presented with a context, information is organized data presented in context and knowledge is information in context along with an understanding of how to use it. Zack (1999) suggests that data represent observations or facts out of context, information results from placing data within some meaningful context, and knowledge is what we come to believe and value based on organized accumulation of information through experience, communication or inference. According to Burton-Jones (1999), data can be viewed as any signals that can be sent by an organization to a recipient-human or otherwise, information is data which are comprehensible to the recipient, and knowledge is the cumulative stock of information and skills derived from the use of information by the recipient. Wiig (1999) suggests that knowledge consists of truths and belief, perspectives and concepts, judgments and expectations, methodologies and know-how. Knowledge is possessed by humans, agents, or other active entities, and thus is used to receive information, as well as identify, analyze, interpret, evaluate and synthesize the information, then plan, implement, monitor and adapt, in order to act more or less intelligently.

Wang and Plaskoff (2002) posit that data have no context and meaning by themselves, information is data that have meaning and context, and knowledge is information infused with insight and experience. Ahmed, Lim and Loh (2002) define data as the symbolic representation of numbers, letters, facts or magnitudes and data can be seen as a series of meaningless outputs from any operation. Information is the group of theses outputs and placing them into in a context that makes a valuable output. Knowledge involves that a person combine his or experience, skills, intuition, ideas, judgments, context, motivations and interpretation (Ahmed, Lim & Loh 2002). Accordingly, data refer to the means through which information and knowledge are stored and transferred. Information is data arranged in meaningful patterns. Knowledge involves incorporating both thinking and feeling elements of an individual (Ahmed, Lim & Loh 2002).

The distinctions among knowledge, information and data can be summarized in Table 2-2.

Table 2-2 Distinctions among Knowledge, Information and Data

Data	Information	Knowledge	Resource
Factors, pictures, number-presented with a context.	Organized data presented in context.	Information in context, along with an understanding of how to use it.	(Brooking 1999)
Observations or facts out of context.	Placing data within some meaningful context.	What we come to believe and value based on organized accumulation of information through experience, communication or inference.	(Zack 1999)
Data have no context and meaning by themselves.	Data that have meaning and context.	Information infused with insight and experience.	(Wang & Plaskoff 2002)
Symbolic representation of numbers, letters, facts or magnitudes.	The group of theses outputs and placing them into in a context that makes a valuable output.	Knowledge involves that a person combine his or experience, skills, intuition, ideas, judgments, context, motivations and interpretation.	(Ahmed, Lim & Loh 2002)
Any signals that can be sent by an organization to a recipient-human or otherwise.	Data which are comprehensible to the recipient.	The cumulative stock of information and skills derived from the use of	(Burton-Jones 1999)

		information by the recipient.	
Raw numbers and facts.	Processed data.	Personalized information.	(Alavi a& Leidner 2001)

Knowledge has the highest value, the most human contribution, the greatest relevance to decisions and actions, as well as the greatest dependence on a specific situation or context. It is also the most difficult of content types to manage since it originates and is applied in the minds of human beings (Grover & Davenport 2001). People who are knowledgeable not only have information, but also have the ability to integrate and frame the information within the context of their experience, expertise and judgment. In other words, people with knowledge can create new information that expands the state of possibilities, and in turn allows for further interaction with experience, expertise and judgment (Grover & Davenport 2001).

Above all, a commonly held view with minor variants is that, data is raw numbers and facts, information is processed data, and knowledge is personalized information (Alavi & Leidner 2001; Dretske 1981; Machlup 1980; Vance 1997). How to effectively differentiate knowledge from information and data lies in noting that knowledge is information possessed in the mind of individuals. As a result, in order for an individual's or a group's knowledge to be useful for others, the knowledge should be expressed in such a way as to be interpretable by the receivers. Besides, hoards of information are of little value. Rather, only that information which is actively processed in the mind of an individual through a process of reflection, enlightenment, or learning can be useful (Alavi & Leidner 2001).

2.2.1.2 Classification of knowledge

Knowledge has been classified typically into tacit knowledge and explicit knowledge (Alavi & Leidner 2001; Leonard & Sensiper 1998; Nonaka 1994; Nonaka & Takeuchi 1995). Nonaka (1994) explicates knowledge in organizations into the following two dimensions:

1. Tacit knowledge: the tacit dimension of knowledge, rooted in action, experience, and involvement in a specific context, is composed of cognitive and technical elements:
    (1) Cognitive: the cognitive element refers to an individual's mental models consisting of mental maps, beliefs, paradigms, and viewpoints, such as a person's belief on cause-effect relationships (Alavi & Leidner 2001).
    (2) Technical: the technical aspect consists of concrete know-how, crafts and skills that apply to a specific context, for example, surgery skills (Alavi & Leidner 2001).
2. Explicit knowledge: the explicit dimension of knowledge is articulated, codified and communicated in symbolic form and/or natural language. An example of explicit knowledge would be a manual accompanying the purchase of a product and the manual contains knowledge on how to appropriately operation the product (Alavi & Leidner 2001).

Nonaka and Takeuchi (1995) clarify that tacit knowledge is personal and context-specific and thus is more difficult to formalize and communicate. Explicit knowledge, however, is more objective and generally can be codified or documented in formal or systematic format (Nonaka & Takeuchi 1995). Alavi and Leidner (2001) propose that tacit knowledge and explicit knowledge are not dichotomous states of knowledge, but mutual dependent and reinforcing qualities of knowledge. The inextricable linkage of tacit and explicit knowledge suggests that only individuals with a required level of shared knowledge can truly exchange knowledge. Consequently, if tacit knowledge is necessary to the understanding of explicit knowledge, then in order for one person to understand another person's knowledge, there must be some overlap in their underlying knowledge base, such as a shared knowledge space (Ivari & Linger 1999; Tuomi 1999).

Nonaka (1994) suggest that the interaction between tacit and explicit knowledge creates new knowledge. Nonaka's (1994) SECI model presents a spiraling process between tacit and explicit knowledge and identifies the four steps of knowledge creation as follows (Nonaka 1994; Nonaka & Konno 1995; Becerra-Fernandez &

Sabherwal 2001):

1. Socialization: the sharing of tacit knowledge between individuals. It is emphasized that tacit knowledge is exchanged through joint activities, such as being together, spending time, living in the same environment, rather than through written or verbal instructions.
2. Externalization: the expression of tacit knowledge and its translation into comprehensible forms that can be understood by others. During the stage of externalization, an individual commits to the group and thus becomes one with the group. The sum of the individuals' intentions and ideas fuse and become integrated with the group's mental world. This stage involves techniques that help express ideas or images as words, concepts, visuals, or figurative language.
3. Combination: the conversion of explicit knowledge into a more complex sets of explicit knowledge. The main issues in this step are communication, diffusion and the systemization of knowledge. New knowledge is spread among the organizational members and the explicit knowledge is edited to make it more usable practically.
4. Internalization: the conversion of newly created explicit knowledge into the organization's tacit knowledge. In this stage, it requires the individual to identify one's self within the organizational knowledge. Learning-by-doing, training and exercises allow the individual to access the knowledge realm of the group and the entire organization.

Nonaka and Konno (1995) introduce the concept of "ba" to further elaborate the knowledge creation model. According to Nonaka and Konno (1995), "ba", a Japanese term which roughly translates into the English word "place", can be thought of as a shared space for emerging relationships. This space can be physical (e.g., office and dispersed business space), virtual (e.g., e-mail and teleconference), mental (e.g., shared experiences and ideas), or any combination of them. "Ba" is considered by Nonaka and Konno (1995) to be a shared space that serves as a foundation for knowledge creation. Knowledge is embedded in "ba", in which knowledge is then acquired through one's own experience or reflections of the experiences of others. "Ba" collects the applied knowledge of the area and

integrates it. Therefore, "ba" can also be viewed as the platform for the "resources concentration" of the organization's knowledge assets and the intellectualizing capabilities within the knowledge creation processes. Nonaka and Konno (1995) suggest that the role of top management is as the providers of "ba" and realizing the dynamism of knowledge creation can help provide the platforms where knowledge can freely emerge.

Though the tacit-explicit knowledge classification is well-known and commonly cited, a variety of other knowledge classifications exist that avoid the recondite subtleties of the tacit-explicit dimension (Alavi & Leidner 2001).

Collins (1993), developing the classification system of knowledge as part of his sociological analysis of artificial intelligence, posits four knowledge types as follows:

1. Symbolic knowledge: knowledge that can be transferred without loss in codified form, i.e., in books and on floppy disk;
2. Embodied knowledge: knowledge held within the body of a human, for instance how to play golf; the knowledge is internalized, but not easily communicated;
3. Embrained knowledge: knowledge held within the physical matter of the brain; certain cognitive abilities are associated to the physical structure of the brain; and
4. Encultured knowledge: knowledge that is linked to social groups and society.

Nonaka (1994) also categorizes knowledge into individual knowledge and collective knowledge. Individual knowledge refers to the knowledge created by and exists in the individual. Social knowledge is the knowledge that is created and inherent in the collective actions of a group.

However, Blumentritt and Johnston (1999) note that the emergence of the knowledge economy has seen a growing interest in operationalizing categories of knowledge. Based on Collin's (1993) analysis while giving the focus on organizational design, Blackler (1995) proposes the following knowledge categories:

1. Embrained knowledge: abstract knowledge dependent on conceptual skills and

cognitive skills; usually conflated with scientific knowledge and accorded superior status;

2. Embodied knowledge: action-oriented and likely to be only partly explicit; transmission requires face to face contact, sentient and sensory information and physical cues; acquired by doing and context-dependent;
3. Encultured knowledge: it refers to the process of achieving shared understanding; embedded in cultural systems, likely to depend strongly on language, and thus to be clearly socially constructed and open to negotiations;
4. Embedded knowledge: it is rooted in systemic routines; relies on the interplay of relationships and material resources, may be embedded in technology, practices, or explicit routines and procedures; and
5. Encoded knowledge: knowledge that is recorded in signs and symbols, such as books, manuals, codes of practice and electron records; encoding involves the distillation of abstract codified knowledge from other richer forms of knowledge.

Moreover, knowledge is characterized into the following four classes (Blumentritt & Johnston 1999):

1. Codified Knowledge: knowledge that has been made explicit by a human; the method of making it explicit may involve writing it down or using other means of capturing, or may be in the form of a demonstration; it is in a readily transferable form;
2. Common knowledge: knowledge that is accepted as standard without having been made formally explicit, often in the form of routines or practices; commonly learned through working in a particular context;
3. Social knowledge: it refers to knowledge about interpersonal relationships and cultural issues, such as the knowledge of 'who can help me in this situation' to cultural issues in different roles; and
4. Embodied knowledge: experience, background and skill that a person has accumulated his or her life lifetime. As a result, embodied knowledge is connected to the knowledge possessor, and relied on pattern and links the possessor can make to a given set of information to build and created appropriate knowledge to solve a problem.

For management purposes, Lundvall (1996) identifies knowledge into four groups:

1. Know-what: knowledge about facts that can be broken down into bits and easily codified;
2. Know-why: knowledge of principles and laws;
3. Know-how: skills, the capability to undertake a given task successful; and
4. Know-who: information regarding who knows what and who knows how to do what.

Zack (1998b) identifies that procedural knowledge is equivalent to know-how, causal knowledge can be seen as know-why, conditional knowledge refers to know-when, and relational knowledge is related to know-with. A pragmatic approach to classify knowledge (Alavi & Leidner 2001) simply attempts to identify useful knowledge for organizations, such as best practices, business framework, and market reports.

An understanding of the classification of knowledge is imperative to develop a reliable and coherent basis for effective knowledge management strategies and practices (Alavi & Leidner 2001; Blumentritt & Johnston 1999). The tacit-explicit knowledge classification is generally cited by researchers (Alavi & Leidner 2001; Leonard & Sensiper 1998; Nonaka 1994; Nonaka & Takeuchi 1995). Extending from Collin's (1993) classification of knowledge, i.e., symbolic, embodied embrained and enclucured knowledge, Blackler (1995) identifies embrained, embodied, cultured, embedded and encoded knowledge in an organizational setting. The various classifications of knowledge are summarized and presented in Table 2-3.

Table 2-3 Classifications of Knowledge

Category		Meaning	Reference
(I)	Tacit knowledge	Knowledge that is rooted in action, experience and involvement in a specific context.	(Alavi & Leidner 2001) (Leonard & Sensiper 1998) (Nonaka 1994) (Nonaka &
(II)	Explicit knowledge	Knowledge that is articulated, codified and communicated in	

		symbolic form and/or natural language.	Takeuchi 1995)
(I)	Symbolic knowledge	Knowledge that can be transferred without loss in codified form.	(Collins 1993)
(II)	Embodied knowledge	Knowledge held within the body of a human and internalized.	
(III)	Embrained knowledge	Knowledge held within the physical matter of the brain.	
(IV)	Encultured knowledge	Knowledge that is linked to social groups and society.	
(I)	Individual knowledge	Knowledge created by and exists in the individual.	(Nonaka 1994)
(II)	Collective knowledge	Knowledge that is created and inherent in the collective actions of a group.	
(I)	Embrained knowledge	Abstract knowledge depending on conceptual and cognitive skills.	(Blackler 1995)
(II)	Embodied knowledge	Action-oriented knowledge which is likely to be only partly explicit.	
(III)	Encultured knowledge	Knowledge embedded in cultural systems.	
(IV)	Embedded knowledge	Knowledge rooted in systemic routines.	
(V)	Encoded knowledge	Knowledge that is recorded in signs and symbols.	
(I)	Know-what	Knowledge about facts that can be broken down into bits and easily codified.	(Lundvall 1996)
(II)	Know-why	Knowledge of principles and laws.	
(III)	Know-how	Skills, the capability to undertake a given task successful.	
(IV)	Know-who	Information regarding who knows what and who knows how to do	

		what.	
(I)	Codified knowledge	Knowledge that has been made explicit by a human.	(Blumentritt & Johnston 1999)
(II)	Common knowledge	Knowledge that is accepted as standard without having been made formally explicit.	
(III)	Social knowledge	Knowledge about interpersonal relationships and cultural issues.	
(IV)	Embodied knowledge:	Experience, background and skill that a person has accumulated his or her life lifetime.	

2.2.2 Knowledge Management

2.2.2.1 Overview of knowledge management

The practice of knowledge management is not new among human beings. Knowledge management activities have been originated since the earliest civilizations evolved (Ives, Torrey & Gordon 1998; Wiig 1997). Duke, Makey and Kiras (1999) describe that, "Much of the knowledge of the Greeks and Persians was preserved in Arabic translations, following the fall of these empires to the expanding Islamic Empire. This knowledge eventually reached the monasteries of Europe where monks, who could be termed knowledge specialists, preserved and translated theses works for contemporary scholars and future generation". From these activities, knowledge has been preserved and passed from generation to generation for people to realize the past and create the future. Though human beings have been practicing knowledge management as early as 4,000 years ago (Wiig 1997), the interests on knowledge management did not take off until the last decades (Bollinger & Smith 2001). Some practitioners even questioned whether knowledge management was only a management fad, or whether knowledge management could indeed create strategic value for the firm. However, during the past several years, knowledge management has become a hot topic among researchers and been enriched with methods, ideas and technologies by contributions from diverse sources

as management science, social science and information science area (Hung 2004). Cortada and Woods (2000) categorize the topics of knowledge management research into four main directions as follows:

1. Nature of knowledge and its management: this group discusses the tacit and explicit nature of knowledge and the ecology of knowledge management (Comeau-Kirschner & Wah 2000; Durrance 1998; Halal 1997; Horvath 2000; Nickols 2000; Plesk 1998; Sveiby 1998).

2. Knowledge based strategies: the strategic view of knowledge was emphasized in this category (Berreby 1999; Birkinshaw 1999; Davenport, DeLong & Beers 1998; Johnson 2000; Skyrme & Amidon 1998; Ulrich 1998).

3. Knowledge management and organizational learning: the issues of this direction comprise organizational learning, collection and codification of knowledge, knowledge transfer, as well as implementation of effective knowledge management (Bednar 1998; Forman 1999; Gordon 1999; Miller 1999; Nurmi 1998; Roberts-Witt 1999; Roth & Kleiner 1998; Ruggles 1998; Shaw, Brown & Bromiley 1998; Trussler 1998).

4. Knowledge management tools, techniques and processes: this class incorporates the topics of information technology, knowledge management tools, knowledge management techniques and measurement of knowledge management effectiveness (Bassi 1997; Cohen 1998; Kaye 1999; Pearson 1999; Ruber 1998; Stephenson & Davis 1999; Tanler 1999; Teresko 1999; Tobin 1998; Wilson 2000).

Earl (2001) suggests that knowledge management can be viewed from various dimensions (see Table 2-4). The first three schools are labeled “technocratic” since they are based on information or management technologies. The fourth school, labeled “economic”, is commercial in orientation, explicitly creating revenue streams form the exploitation of knowledge and intellectual capital. The other three schools can be seen as more behavioral, stimulating managers and managements to be

proactive in the creation, sharing and use of knowledge as a resource.

Table 2-4 Schools of Knowledge Management

School / Attribute	Technocratic		
	I. Systems	**II. Cartographic**	**III. Engineering**
Focus	Technology	Maps	Processes
Aim	Knowledge bases	Knowledge directories	Knowledge flows
Unit	Domain	Enterprise	Activity
Critical Success Factors	Content validation incentives to provide content	Culture/ incentives to share knowledge networks to connect people	Knowledge learning and information unrestricted distribution
Principal IT Contribution	Knowledge-based systems	Profiles and directories on internets	
Philosophy	Codification	Connectivity	
School / Attribute	**IV. Economic**		
	Commercial		
Focus	Income		
Aim	Knowledge assets		
Unit	Know-how		
Critical Success Factors	Special teams institutionalized process		
Principal IT Contribution	Intellectual asset register and processing system		
Philosophy	Commercialization		
School / Attribute	**Behavioral**		
	V. Organizational	**VI. Spatial**	**VII. Strategic**
Focus	Networks	Space	Mindset
Aim	Knowledge	Knowledge	Knowledge

	pooling	exchange	capabilities
Unit	Communities	Place	Business
Critical Success Factors	Sociable culture knowledge intermediaries	Design for purpose encouragement	Rhetoric artifacts
Principal IT Contribution	Groupware and intranets	Access and representational tools	Eclectic
Philosophy	Collaboration	Contactivity	Consciousness

(Adapted from Earl 2001)

According to Earl (2001), the system dimension focuses on information technology. The cartographic dimension emphasizes on mapping organizational knowledge for building knowledge directories. The engineering dimension aims at having better knowledge flow with shared databases to enhance business performance. The commercial dimension is concerned with protecting and exploiting knowledge assets in organizations to produce revenues. The organizational dimension refers to the use of knowledge communities consisting of people with common interest, problem or experience to share knowledge. The spatial dimension highlights the use of space to facilitate knowledge exchange and sharing. Finally, the strategic dimension sees knowledge as a key resource and knowledge management as a way to gain competitive advantage.

Zack (1999) sustains that knowledge management is related to context. The four principal contexts of knowledge management includes: (i) strategic context, which refers to the intent and ability of an organization to exploit its knowledge and learning capabilities better than its competitors; (ii) knowledge context, which is associated with the competitiveness of an organizational knowledge; that is, what it must know to compete in the market place effectively; (iii) organizational context, which refers to the organizational roles, structures and socio-cultural factors, e.g., culture, power relation, norm, reward system and management philosophy; and (iv) technology context, which depicts the information technology infrastructure and capabilities required to provide adequate knowledge management architecture.

2.2.2.2 Definition of knowledge management

Depending on the purpose of research, knowledge management has been defined in numerous ways (Alavi & Leidner 1999; Bonner 2000; Carayannis 1999; Carlsson 2001; Cortada & Woods 2000; Davenport, DeLong and Beers 1998; Drew 1999; Duffy 1999; Duke, Makey & Kiras 1999; Malhotra 2000; Nidumolu, Subramani & Aldrich 2001; Quintas, Lefrere & Jones 1997; Ruggles 1998; Sarvary 1999; Scarbrough, Swan & Preston 1999; Tiwana 2001). Alavi and Leidner (1999) define knowledge management as "a systemic and organizationally specified process for acquiring, organizing and communicating both tacit and explicit knowledge for employees so that other employees may make use of it to be more effective and productive at work". Carayannis (1999) refers knowledge management to be a socio-technical system of tacit and explicit business policies and practices, which were facilitated via the strategic incorporation of information technology tools, business processes, as well as intellectual, human and social capital. Knowledge management is defined by Sarvary (1999) as a business process thought which firms create and use their institutional or collective knowledge. Duffy (1999) describes knowledge management as a process capitalizing on organizational intellect and experience to drive innovations. Ruggles (1998) defines knowledge management as an approach to adding or creating value by more active leveraging the know-how, experience and judgment, which reside with and in several cases, outside of an organization. According to American Productivity and Quality Center (1999), knowledge management is the strategies and processes of identify, capturing and leveraging knowledge to help the firm compete.

Knowledge management can be viewed as "a set of activities using individual and external knowledge to produce outputs and the activities include knowledge acquisition, creation and application" (Nidumolu, Subramani & Aldrich 2001). Tiwana (2001) suggests that knowledge management is to manage organizational knowledge for creating business value and generating competitive advantages.

According to Carlsson (2001), knowledge management in this study is defined as follows:

> "Knowledge management is the process of identifying, managing and leveraging individual and collective knowledge to support the firm becoming more competitive (Carlsson 2001, p. 195)."

This definition highlights the primary components of knowledge management in the increasingly competitive business world. Firstly, both individual and collective knowledge are identified. Secondly, knowledge management involves the process of collecting, integrating and utilizing knowledge. Thirdly, knowledge management is mainly anticipated to increase a firm's competitiveness.

2.2.2.3 Elements of Successful Knowledge Management

Effective knowledge management is considered vital to the success of contemporary organizations (Becerra-Fernandez & Sabherwal 2001). Organizations are viewed by some researchers as distributed knowledge systems (Tsoukas1995), streams of knowledge (von Krogh, Roos & Slocum 1994) and systems of distributed cognition (Boland & Tenkasi 1995; Weick & Roberts 1993), in which individuals act autonomously while understanding their interdependence with others. It is underlined that organizations consist of individuals who coordinate their actions with each others. Therefore, "collective mind", instead of organizational mind, is adopted by Weick & Roberts (1993) and described as a set of heedful interrelationships rather than a repository of knowledge. Organizations then serve as a knowledge-integrating institution, integrating the knowledge of manage different individuals and groups in the process of producing goods and services (Grant 1996; Holtshouse 1998; Kogut & Zander 1992; Nonaka 1994).

For effective knowledge management in organization, Davenport (1996) proposed the following ten principles:

1. Knowledge management is expensive (but so is stupidity).
2. Effective management of knowledge requires hybrid solutions of people and technology.
3. Knowledge management is highly political.
4. Knowledge mangers are requisite for knowledge management.

5. Knowledge management benefits more from maps than models, more from markets than from hierarchies.
6. Sharing and using knowledge are often unnatural acts.
7. Knowledge management means improving knowledge work processes
8. Knowledge access is merely the beginning.
9. Knowledge management never ends.
10. Knowledge contracts are highly recommended.

The principles of knowledge management provide more pragmatic suggestion for organizations in managing and using knowledge effectively on a daily basis, rather than addressing high-level philosophy (Davenport 1996). Knowledge can be an asset for organizations, while its effective management requires investment of other assets. However, even though several knowledge management activities call for investment of money and labor, the cost of ignorance and stupidity, such as forgetting what key employees know and making poor decisions based on fault knowledge, is even more expensive (Davenport 1996). Both humans and machines should be used in complementary ways to construct hybrid knowledge management environments. Knowledge cannot be well-managed until some key persons were designed to have clear responsibilities for administrating knowledge management (Davenport 1996). According to Davenport (1996), in the real business world, if no politics appear around the knowledge management initiative, the organization would perceive that nothing valuable is taking place. Moreover, knowledge sharing and using should be motivated since people would tend to hoard knowledge by assuming knowledge as a valuable resource of individuals. Finally, it should be noted that knowledge management is an ongoing task since new technologies, management techniques, regulatory issues and customer concerns are always emerging.

Wiig (1999) offers a set of knowledge management building blocks, which include: (i) obtaining management buy-in; (ii) surveying and mapping the knowledge landscape; (iii) proposing the knowledge strategy; (iv) creating and defining knowledge-related alternatives and initiatives; (v) revealing benefit expectations for knowledge management initiatives; (vi) setting knowledge management priorities; (vii) deciding key knowledge requirements; (viii) acquiring essential knowledge; (ix)

establishing integrated knowledge transfer programs; (x) transforming, distributing and applying knowledge assets; (xi) developing and updating knowledge management infrastructure; (xii) coordinating knowledge management activities and functions; and (Xiii) monitoring knowledge management.

Most knowledge management projects are suggested to have one of the following three aims (Davenport & Prusak 1998):

1. To make knowledge visible and indicate the role of knowledge in an organization, largely through maps, yellow pates and hypertext tools.
2. To develop a knowledge-intensive culture by encouraging and aggregating behaviors such as knowledge sharing.
3. To build a knowledge infrastructure, which composes of not only a technical system, but also a web of connections among people given space, time, tools and encouragement to interact and collaborate.

Moreover, Wong and Aspinwall (2005) examined the critical success factors (CSFs) for knowledge management adoption in the small and medium enterprises (SMEs) sector. It is recommended that the CFS, in order of importance (i.e., ranked from the highest to the lowest), for implementing knowledge management in small and medium enterprises are as follows (Wong & Aspinwall 2005):

1. Management leadership and support;
2. Culture;
3. Strategy and purpose;
4. Resources;
5. Processes and activities;
6. Training and education;
7. Human resource management;
8. Information technology;
9. Motivational aids;
10. Organizational infrastructure; and
11. Measurement.

Wong and Aspinwall (2005) highlight that successful knowledge management requires proactive entrepreneurial support and leadership from top management, particularly in the small and medium enterprises. Top management and leaders should contribute to promote a corporate mindset that emphasizes cooperation and knowledge sharing across the organization, create an environment in which knowledge creation and cross-boundary learning can flourish, as well as provide continual support and commitment to imitate and sustain the effort for knowledge management.

However, several problems and obstacles could be induced in managing knowledge in organizations. Not all firms are successful when they actually precede the management of knowledge. Some potential concerns regarding knowledge management should be noticed. Liebowitz (1999a) maintained that organizations should completely recognize five major concerns on knowledge management. Those questions associated with knowledge management are: (i) how to create a knowledge sharing environments; (ii) how to value the knowledge in the organization to show some tangible benefits; (iii) how to overcome the conviction that knowledge management is only information management; (iv) how to obtain support, e.g., commitment and involvement, from top management; and (v) how to sustain knowledge management. Meanwhile, Fahey and Prusak (1998) pointed out eleven mistakes of knowledge management, including: (i) not developing a operational definition of knowledge; (ii) emphasizing knowledge stock to the detriment of knowledge flow; (iii) viewing knowledge as existing mostly outside the heads of individuals; (iv) not realizing that a basic intermediate purpose of knowledge management is to create shared context; (v) paying little attention to the role and significance of tacit knowledge; (vi) disentangling knowledge from its users; (vii) downplaying thinking and reasoning; (viii) focusing on the past and present, while ignoring the future; (ix) not understanding the importance of experimentation; (x) substituting technical contact for human interface; and (xi) seeking direct measures of knowledge.

2.2.3 Resource-Based View of Knowledge and Knowledge Management

Attention in the area of knowledge management has grown dramatically over the last decades (Hislop et al. 2000). Particularly, the current knowledge management studies have been linked to the resource-based view and its extension, knowledge-based view (Clarke & Turner 2004). Clarke and Turner (2004) suggest that knowledge management has become the focal point for debates on mechanisms to facilitate firms acquiring greater competitive edge in the emerging global information economy. In these debates, a firm's competitive advantage is considered to result from its unique knowledge and how it manages the knowledge (Carlsson 2001; Clarke & Turner 2004). Thus, in examining the role of knowledge and knowledge management in life insurance enterprises in Taiwan, this study predominantly adopts the perspectives that knowledge and knowledge management are viewed as the resources for organizations to increase their competency in the extremely competitive environments.

The Resource-Based View (RBV) focuses mostly on a firm's resources, their implications for performance, as well as their relationship with environmental threats and opportunities (Wernerfelt 1984). Barney (1991) suggests that resources are inputs in to a firm's production process and a firm's resources are classified by Michalisin, Smith and Kline (1997) as either tangible or intangible resources. The tangible resources typically refer to the property-based resources, whereas the intangible resources refer to the knowledge-based resources, the ways in which firms combine and transform these tangible resources (Michalisin, Smith & Kline 1997). Building on the resource-based view, a knowledge-based perspective of the organizations has emerged in the management literature in 1990s (Cole 1998; Nonaka & Takeuchi 1995; Spender 1996). The knowledge-based perspective suggests that the services rendered by tangible resources depend on how they are combined and applied, which is a function of the firm's know-how (i.e., knowledge).

According to the so-called VRIO framework (Barney 1997), a firm's resources should be "valuable", "rare" and "inimitable", having an "organization "exploiting these resources to generate sustained competitive advantages. The VRIO analysis

framework is structured in a series of four questions (Barney 1997) as presented in Table 2-5.

Table 2-5 VRIO Analysis Framework

VRIO Analysis	Main Question
The Question of Value	Do a firm's resources and capabilities enable the firm to respond to environmental threats or opportunities?
The Question of Rareness	How may competing firms already possess particular valuable resources and capabilities?
The Question of Imitability	Do firms without a resource or capability face a cost disadvantage in obtaining it compared to firms that already possess it?
The Question of Organization	Is a firm organized to exploit the full competitive potential of its resources and capabilities?

(Barney 1997)

The role of knowledge and knowledge management in organizations can be investigated via answering the four questions above. Firstly, knowledge and its effective management can result in improved products, processes, or services, and thus enable organizations to remain competitive and viable. Secondly, organizational knowledge is the sum of employees' know-how, know-what and now-why (Bollinger & Smith 2001). Such knowledge is composed of the knowledge and experiences of current and previous employees, as well as the specific organization. The policies and methods used in different organizations would also be unique. Thirdly, the individual in the organization contribute knowledge based on their personal interpretations of information. Group interpretations of knowledge depend on the synergy of the total members of the group. Besides, organizational knowledge and its approaches to leverage the knowledge are built o the inimitable past history of the organization's own experiences and accumulated expertise (Bollinger & Smith 2001). Accordingly, it is uncommon that two groups or organization will think or function in identical ways. Lastly, knowledge is carried through organization systems, routines, policies,

document and employees (Grant 1996; Spender 1996). Hoards of information or knowledge are of little value. Organizations should actively acquire, integrate and use both individual knowledge and organizational knowledge to create and sustain competitive advantages (Alavi & Leidner 1999). Therefore, the specific knowledge and the appropriate management of it are considered to be the resources of an organization to generate long-term sustainable competitive advantages.

2.3 Theoretical Background

This section depicts the three primary theories, including the Theory of reasoned Action (TRA) (Ajzen & Fishbein 1980), Technology Acceptance Model (TAM) (Davis 1986) and Innovation Diffusion (ID) (Rogers 1995), which are the basis to form the conceptual framework in this study. The theory of reasoned action is one of the most influential theories of human behavior (Ajzen & Fishbein 1980). Davis's (1986) technology acceptance model extends the theory of reasoned action to predict the adoption and usage of new technology. The diffusion of innovation suggested by Rogers (1995) further discusses the process regarding how an innovation is adopted and diffused in an organization. This study attempts to investigate why people reject or adopt knowledge management. The theory of reasoned action provides the determinants of behaviors, such as attitudes and social normative beliefs. It was reported by Yang (2004) that the practical operations of knowledge management in Taiwan life insurance enterprises were mostly focused on information systems. Accordingly, technology acceptance models are considered to be helpful in enlightening the understanding of the acceptance and applications of knowledge management in Taiwan life insurance industry. Finally, while the business world has embraced the applications of knowledge management commonly, the same is not true for the life insurance industry in Taiwan. For most of the life enterprises in Taiwan, knowledge management is still new, i.e., an innovation, for them. Yang (2004) argued that Taiwan life insurance industry should employ the concepts and suggestions of innovation in having knowledge management into place. Therefore, Rogers's (1995) Innovation Diffusion is based to investigate the adoption and applications of knowledge management among Taiwan life insurance enterprises. The following literature review, though not exhaustive, would provide useful insights into the adoption and dissemination of an innovation, e.g., knowledge management.

2.3.1 Theory of Reasoned Action

The Theory of Reasoned Action (TRA) has been used to realize human behavior assuming that human beings make rational decisions (Ajzen & Fishbein 1975). The TRA proposes that there are casual relationships linking beliefs, attitudes and behaviors (Ajzen & Fishbein 1980). An individual's intention reflects his or her willingness to perform a specific behavior and the intention is affected by behavior attitude and subjective norm. The TRA model suggested by Ajzen and Fishbein (1980) is presented in Figure 2-1.

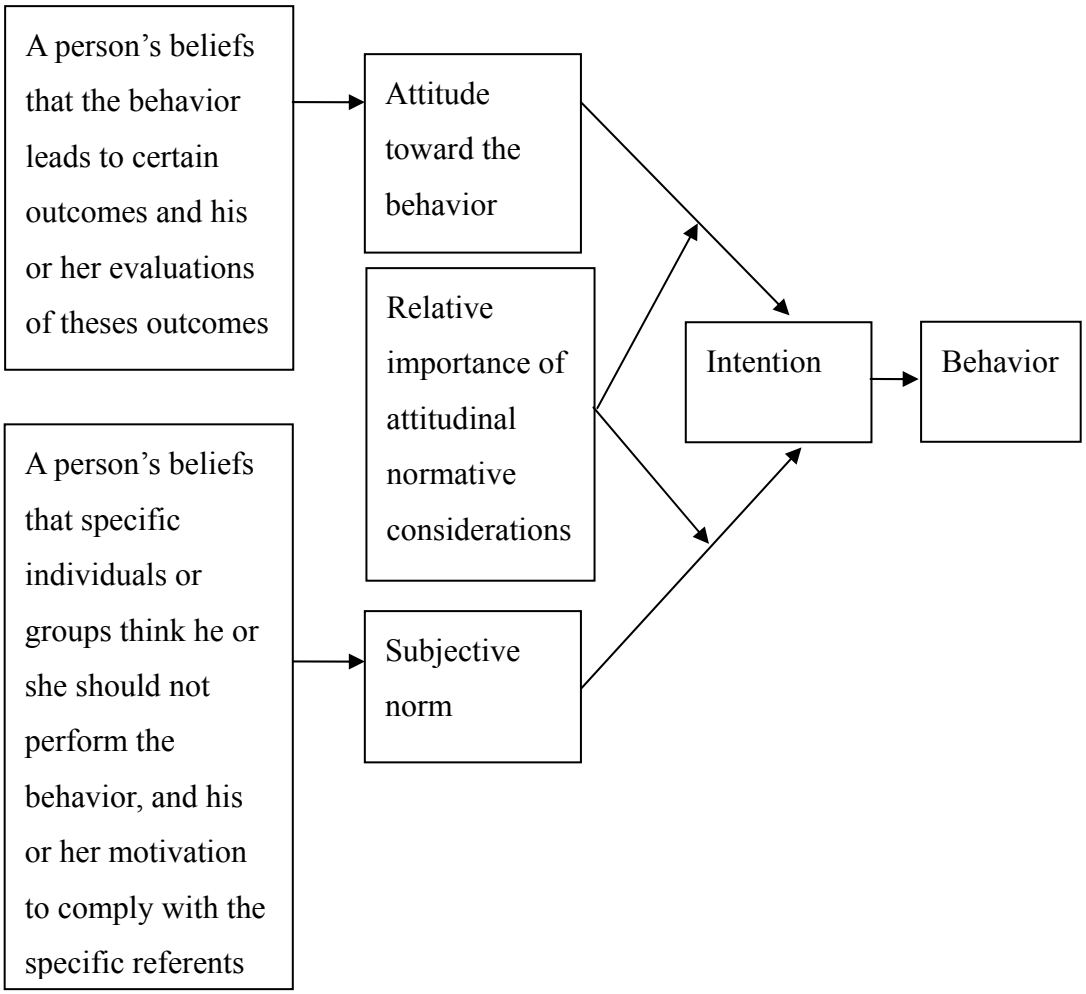

Figure 2-1 Theory of Reasoned Action Model (Ajzen & Fishbein 1980)

Drawn from social psychology, the Theory of Reasoned Action has been suggested by previous researchers as a primary theoretical foundation for research on the determinants of human behaviors (Ajzen & Fishbein 1980; Christie 1981; Swanson

1982). According to the Theory of Reasoned Action, a person's behavior (B) is a function of his or her behavior intention (BI) which is determined by the person's attitude toward the act and by his or her beliefs about the expectations of others, i.e., social normative beliefs (NBs) (Ajzen & Fishbein 1970, 1975, 1980). A person's attitude toward the behavior is determined by his or her beliefs that the behavior will lead to certain outcomes and by his or her evaluation of the outcomes. Meanwhile, the subjective norm is determined by the person's beliefs that specific referents that he or she should or should not perform the behavior and by his or her motivations to comply with the specific referents (Ajzen & Fishbein 1980). The relative weight of the two determinants of intention is the solution for the situation of conflict between attitude the behavior and subjective. Hence, it is possible to predict a person's intention by measuring his or her attitude toward performing the behavior, the subjective norm and the relative weights (Ajzen & Fishbein 1980). Ajzen and Fishbein (1980) suggest that people consider the implications of their actions before they decide to engage or not to engage in certain behavior. The assumption in TRA is that human beings are usually quite rational and make systemic use of the information available to them.

In the TRA, "attitude toward the behavior", referring to the attitudinal factor, is defined as the individual's positive or negative evaluation of performing the behavior (Ajzen & Fishbein 1980). The attitudinal factors are related to the person's judgment that performing the behavior is good or bad, as well as that he is in favor or against performing the behavior. Ajzen and Fishbein (1980) define "subjective norm", referring to the social influence, as the person's perception of the social pressures put on him or her to perform or not to perform the behavior in question. It is supposed that individuals will intend to perform a behavior when they evaluate performing the behavior positively, and when they believe that important others think they should perform the behavior (Ajzen & Fishbein 1980).

External variables are suggested to be related to behavior only if they are related to one or more of the variables specified in the TRA (Ajzen & Fishbein 1980). The external variables could be demographic variables (e.g., age, sex, occupation, socioeconomic status, religion and education), attitude toward target (e.g., attitude

toward people and attitude toward institutions) and personality traits (e.g., introversion-extraversion, neuroticism, authoritarianism and dominance). It is alleged that theses external variables can only affect on people's behavior indirectly through beliefs and attitude the behavior (Ajzen & Fishbein 1980). The indirect effect of external variables on behavior can be diagrammatically shown in Figure 2-2.

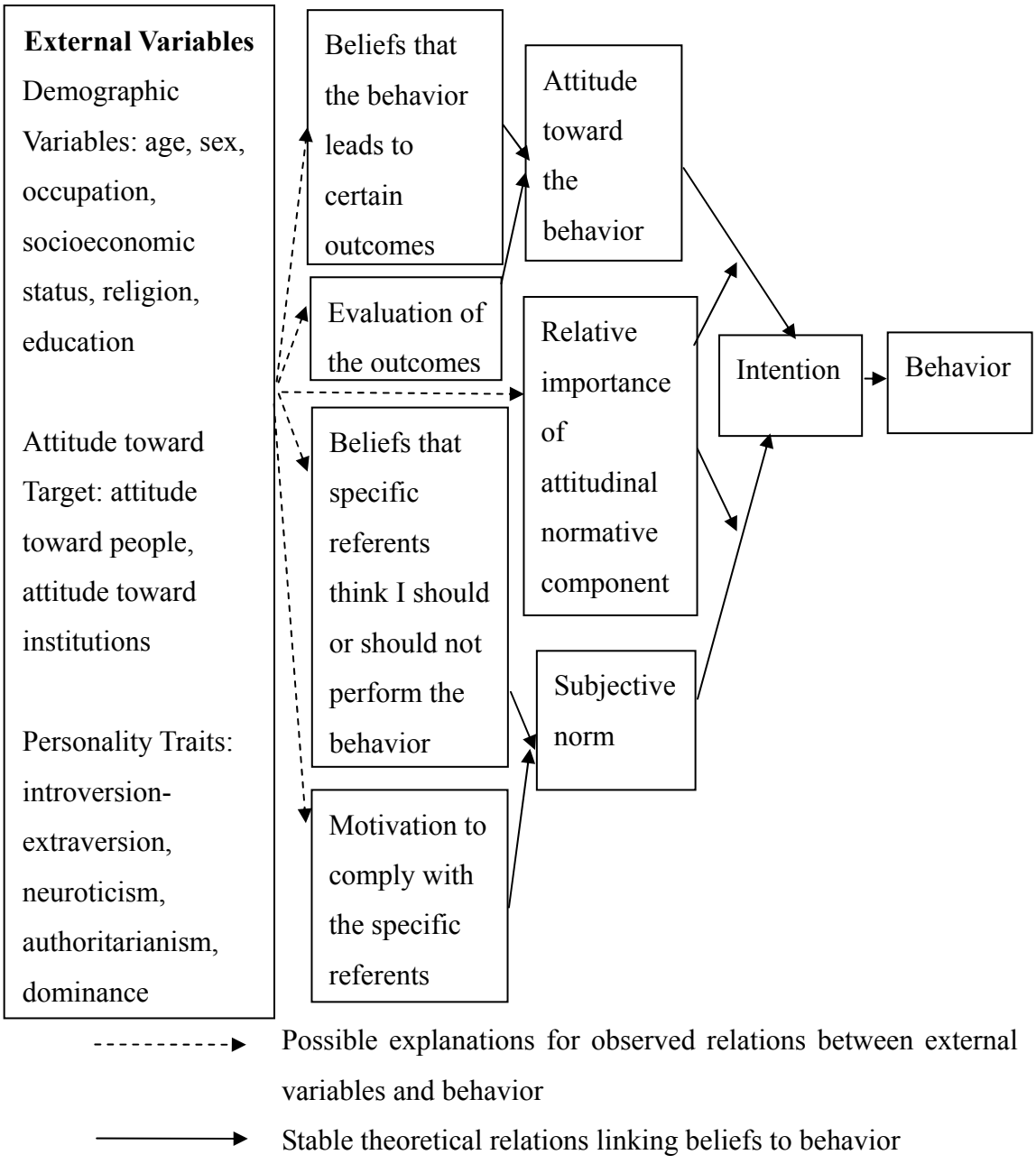

Figure 2-2 Indirect Effect of External Variables on Behavior (Ajzen & Fishbein 1980)

The Theory of Reasoned Action (TRA) model has been extensively validated and successfully applied to explain behavior across various areas, such as choosing alternative in PDG (Ajzen & Fishbein 1970), purchasing brand beer (Ajzen & Fishbein 1980), eating at a fast food restaurant (Brinberg & Durand 1983), having breast cancer examination (Timko 1987), automation in manufacturing (Farhoomand, Kira & Williams 1990) and internet banking (Tan & Teo 2000). Nonetheless, little literature has been found using the TRA to explain the acceptance and use of knowledge management in the life insurance industry. Notwithstanding the lack of literature that demonstrates the use of TRA to predict the adoption and practice of knowledge management, the research employs the TRA model in that it examines the beliefs and social norm, as well as the general attitudes toward the adoption of knowledge management. It should be noted that the TRA focuses on the attributes of adoption that are associated with the individual as the unit of analysis. However, knowledge management adoption and practice is executed in an organizational context. As a result, applying the TRA without accounting for the external, facilitating, managerial and cultural influences related to an innovation, such as knowledge management, for both individuals and organizations, would be limited in answering the research questions in this study. Therefore, Davis's (1986) Technology Acceptance Model (TAM) and Innovation Diffusion (ID) of Rogers (1995) are adopted as the other two grounding theories to address the possible external variables and potential organizational influences that affect the adoption and practice of knowledge management in Taiwan life insurance industry. The technology acceptance models and the theory of innovation diffusion are presented in detail in next sections.

2.3.2 Technology Acceptance Model

Technology Acceptance Model (TAM), introduced by Davis (1986), is an extension of the TRA model and has been broadly utilized in investigating the acceptance and usage of information technology (Davis, Bagozzi & Warshaw 1989). Not as general as TRA, the target of the TAM model is to explain how users come to accept and use information technology (IT) across a wide range of computer technologies and user populations (Davis, Bagozzi & Warshaw 1989). Davis, Bagozzi and

Warshaw's TAM model provides a basis for tracing the impact of external factors on internal beliefs, attitudes and behavior intentions to predict actual usage. The TAM model of (Davis, Bagozzi & Warshaw 1989) is presented below in Figure 2-3.

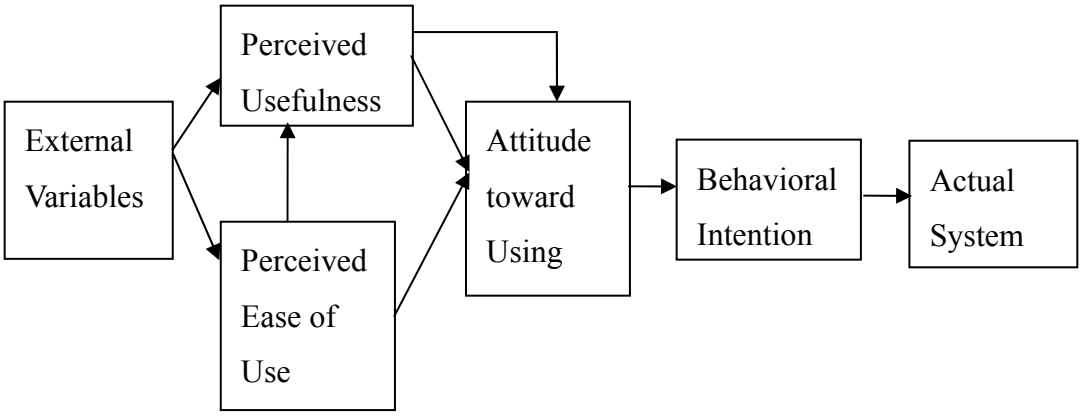

Figure 2-3 Technology Acceptance Model (Davis, Bagozzi & Warshaw 1989)

Technology Acceptance Model posits that two particular beliefs, i.e., Perceived Usefulness and Perceived Ease of Use, are of primary relevance for computer acceptance behaviors (Davis, Bagozzi & Warshaw 1989). According to Davis, Bagozzi and Warshaw (1989, p. 985), Perceived Usefulness (PU) is defined as "the prospective user's subjective probability that using a specific application system will increase his or her job performance within an organizational context". Perceived Ease of Use (PEOU) is defined as "the degree to which the prospective user expects the target system to be free of effort". PU and PEOU are suggested by researchers (Hauser & Shugan 1980; Larcker & Lessig 1980; Swanson 1987) to be two distinct constructs statistically. In the TAM model, it is postulated that computer usage is determined by behavioral intention to use (BI), and the behavior intention is determined by the person's attitude toward using the system (A) and perceived usefulness (PU), with relative weights estimated by regression (Davis, Bagozzi & Warshaw 1989). The A-BI relation of TAM implies that people form intentions to perform behaviors toward which they have positive affect. Such a relationship of A-BI is also fundamental in the TRA. Moreover, the PU-BI relation is based on the idea that, within an organizational setting, people form intention toward behaviors they believe will increase their job performance (Davis, Bagozzi & Warshaw 1989).

The reason is that enhanced job performance is instrumental to achieve various rewards that are extrinsic to the content of the work itself, e.g., pay increases and promotions.

Perceived Ease of Use (PEOU) is also suggested to have effect on the attitude toward using the system (A) (Davis, Bagozzi & Warshaw 1989). The easier a system is to interact with, the greater would be the user's sense of efficacy (Bandura 1982) and personal control (Lepper 1985) in regard with his or her ability to carry out the sequences of behavior needed to operate the system. Efficacy is one of the significant factors theorized to underline the intrinsic motivation (Bandura 1982; Lepper 1985). Therefore, the direct PEOU-A relation is proposed to capture the intrinsically motivating aspect of PEOU (Carroll & Thomas 1988; Davis 1986; Davis, Bagozzi & Warshaw 1989; Malone 1981a).

In the meantime, the TAM model argues that PEOU can be affected by various external variables over and above PEOU (Davis, Bagozzi & Warshaw 1989). To illustrate, assuming that there are two forecasting systems which are equally easy to operate, if one of them produces more accurate forecasts, it would likely be considered to be the more useful (U) system. According to Davis, Bagozzi and Warshaw (1989), the objective design characteristics of a system would have a direct effect on PEOU in addition to indirect effects via PEOU. It can be inferred that PEOU has impact on PU. That is, the easier a system is to use, the less effort is required to perform a certain task, and thus the more effort can be directed to other job tasks to enhance the overall job performance (Davis, Bagozzi & Warshaw 1989, 1992).

To extend the TAM model, Davis, Bagozzi and Warshaw (1992) posit that the user's intention to adopt computer usage in the workplace is influenced by both extrinsic and intrinsic motivations. On one hand, "extrinsic motivation" is referred to the performance of an activity because it is perceived to be instrumental in achieving valued outcomes that are distinct from the activity itself, such as improved job performance, pay or promotions (Davis, Bagozzi and Warshaw 1992). On the other hand, "intrinsic motivation" is associated with the performance of activity for no

apparent reinforcement other than the process of performing the activity per se (Davis, Bagozzi and Warshaw 1992). Under this dichotomy, perceived usefulness is considered to be an example of extrinsic motivation, while enjoyment is an example of intrinsic motivation. Perceived usefulness is defined by Davis, Bagozzi and Warshaw (1992) as the initial TAM model (Davis, 1989; Davis, Bagozzi & Warshaw 1992) to measure a person's expectation that using the computer will result in improved job performance. Davis, Bagozzi & Warshaw (1992) refers enjoyment to the extent to which the activity of using the computer is perceived to be enjoyable in its own right, apart from any performance consequences that may be anticipated (Carroll & Thomas 1988; Malone 1981b). The findings of Davis, Bagozzi and Warshaw (1992) indicate that people's intentions to use computers in the workplace are affected mainly by the perceptions regarding how useful the computers are for improving their job performance, and secondarily by the degree of enjoyment they experience in using the computers. On one hand, enhancing the enjoyment of using a system helps to get a productive system accepted by users. On the other hand, increasing enjoyability would encourage unproductive or frivolous overuse of systems where less time spent using the computer would get the job done adequately.

Technology Acceptance Model has been supported and validated by numerous researchers in a variety of settings and across a range of IT applications, including personal computer (Igbaria, Guimaraes & Davis 1995; Moore & Benbasat 1991; Thompson, Higgins & Howell 1991), voice-mail (Adams, Nelson & Todd 1992; Straub, Limayem & Karahanna 1995; Subramanian 1994), spreadsheet (Chau 1996; Mathieson 1991), CASE tools (Premkumar & Potter 1995; Wynekoop, Senn & Conger 1992), database package (Szajna 1996), Windows (Karahanna, Straub & Chervany 1999), workstations (Lucas & Spitler 1999), Expert Systems (Gefen & Keil 1998; Keil, Beranek & Konsynski 1995), Enterprises Resources Planning systems (Gefen 2000), internet-based applications (Rai, Ravichandran & Samaddar 1998; Venkatesh 1999), computer center (Taylor & Todd 1995a, 1995b), e-mail (Adam, Nelson & Todd 1992; Gefen & Straub 1997; Karahanna, Straub & Chervany 1999; Straub 1994; Straub, Keil & Brenner 1997; Szajna 1996; Venkatesh & Davis 1994), word processors (Chau 1996; Davis, Bagozzi & Warshaw 1992) and E-commerce (Gefen & Straub 2000).

As described above, the TAM model was originally designed to explain the behavior of computer usage, and has been widely used and accepted as a robust model to measure IT acceptance and usage (Taylor & Todd 1995b; Venkatesh et al. 2003). Nevertheless, there is little literature available using TAM to predict the adoption and use of knowledge management among the life insurance enterprises. While the TAM model is specifically tailored for modeling user acceptance of information systems (Davis, Bagozzi and Warshaw 1989), it is considered to be plausible that the TAM model may facilitate the understanding of knowledge management adoption and practice in Taiwan life insurance industry as most Taiwan life insurance companies have put their emphases on information systems while embarking on knowledge management (Yang 2004).

Different from the TRA, the early TAM model doest not include Subjective Norm (SN) as a determinant of behavior intention to use a given system (Davis, Bagozzi & Warshaw 1989; Lucas & Spitler 1999). The rationale could be that Davis, Bagozzi and Warshaw's (1989) experiments were primarily concerned with the students in a setting of school. However, Thompson, Higgins and Howell (1991) identify the relationship from social norms to PC utilization in a large manufacturing company. Dishaw and Strong (1999) argue that subjective or social norms are definitely more important in the scenery of organizations. This study investigates the adoption and practice of knowledge management in an organizational setting. Therefore, in using the TAM model to explain the IT aspects of knowledge management applications, the construct of subjective norm will be incorporated to examining the influence of other people on the individuals in adopting and applying knowledge management. In addition, the TAM model provides the bridge between external variables and the beliefs, attitudes and intentions. It is indicated that external variables, such as individual differences, system characteristics, situational constraints, managerial involvements, organizational factors and development/implementation processes, only have indirect influence on behavior through internal beliefs, attitudes and intentions (Davis, Bagozzi & Warshaw 1989; Szajna 1996). The role of external variables has not been well explored in the TAM model originally and "future research" was called for by Davis (1993) to examine the role of additional (external)

variables within TAM. Meanwhile, the TAM model focuses on individual adoption and has few discussions on the influences from outside of the organization, such as environments, customers and competitors. This research would take into account the external variables by adding other external influences or facilitating contextual factors, which are suggested essential in the innovation adoption/diffusion studies described in the subsequent section.

2.3.3 Innovation Diffusion

According to Rogers (1995, p.11), an innovation is defined as "an idea, practice, or object that perceived as new by an individual or other unit of adoption". It is argued that innovation adoption is a process of uncertainty reduction and information gathering (Rogers 1995). Information about the existence of the innovation and its characteristics flows through the social system within which adopters are situated (Rogers 1995). Potential adopters engage in information-seeking behaviors to learn about the expected consequences of employing the innovation. The assessment and evaluation of this information determines the adopters' behaviors and thus affect the processes of innovation diffusion (Rogers 1995).

In the theory of Innovation Diffusion, diffusion refers to "the process by which an innovation is communicated through certain channels over time among the members of social system" (Rogers 1995, p.5). Therefore, there are four elements in the diffusion of innovation as follows: the innovation, communication channels, time and the social system (Rogers 1995).

As defined above, the perceived newness of an idea determines the individual's reaction to the "innovation". It matters little whether an idea is objectively new by measuring the lapse of time since its first use of discovery. Someone may have known about an innovation for some time but not developed a favorable or unfavorable attitude toward it yet, nor have adopted or rejected it. "Newness" of an innovation can be expressed in terms of knowledge, persuasion, or a decision to adopt or reject the innovation (Rogers 1995). Rogers (1995) suggests that the individual's rate of adoption will be primarily affected by the following five perceived attributes of innovations:

1. Relative Advantage: the degree to which an innovation is perceived as better than it supersedes.
2. Compatibility: the degree to which an innovation is perceived as being consistent with the existing values, past experiences, and needs of potential adopters.
3. Complexity: the degree to which an innovation is perceived as difficult to understand and use.
4. Trialability: the degree to which an innovation may be experimented with on a limited basis.
5. Observability: the degree to which the results of an innovation are visible to others.

Taylor and Todd (1995a) describe "relative advantage" as the advantages relative of an innovation to other innovations or existing ways of doing things, and use "compatibility" to measure how compatible an innovation is with existing culture, structure, infrastructure and previously adopted ideas. Trialability is referred by (Taylor & Todd 1995a) to how easy of an innovation is to try out or test, and observability reflects how easy the outcomes of on innovation can be observed.

The choices to adopt or reject an innovation can be made by a selected group or individual with some sort of authority or technical expertise (Rogers 1995). In this study, knowledge management is seen as an innovation for the staff as well as the managers in Taiwan life insurance enterprises. Though knowledge management has been utilized in various areas, the exploitation of knowledge management in the life insurance industry in Taiwan has commenced just recently (Yang 2004). There is also a scarcity of empirical research discussing knowledge management in the service industry. Viewing knowledge management as an innovation for the life insurance industry, whether the employees think that knowledge management brings relative advantages for them, whether the knowledge management initiatives are compatible with the existing systems and operations, whether it is quite complicated to try out and apply the relevant procedures and whether the consequences of such endeavors can be visible, would have considerable effect on the adoption and

practice of knowledge management in Taiwan life insurance industry.

Communication channels are the means by which messages get from one individual to another through the mass media and interpersonal channels (Rogers 1995). Innovation diffusion can be seen as a particular type of communication in which the message content exchanged is associated with a new idea, e.g., an innovation. Rogers (1995) indicates that mass media channels are often the most rapid and efficient means to inform an audience of potential adopters about the existence of an innovation, while interpersonal channels are more effective in persuading an individual to accept a new idea, especially if they link two or more individuals who are similar in socioeconomic status, education, or other important ways.

The "time" element is one of the strengths of the theory of Innovation Diffusion and makes it distinct from much of other behavioral science research, in which the time aspect is disregarded (Rogers 1995). The time dimension involved in diffusion can chiefly refer to the innovation–decision process, through which an individual or other decision-making unit passes from first knowledge of an innovation, to the formation of an attitude toward the innovation, to a decision to adopt or reject, to implementation and use of the new idea, and to confirmation of this decision (Rogers 1995). This process consists of five main stages: (i) knowledge, which is gained when an individual or other decision-making unit learns of the existence of an innovation and obtains some understanding of how it functions; (ii) persuasion, which takes place when the individual or other decision-making unit forms a favorable or unfavorable attitude toward the innovation; (iii) decision, which occurs when the individual or other decision-making unit engages in activities that lead to a choice to adopt or reject the innovation; (iv) implementation, which refers to the phase that the individual or other decision-making unit puts the innovation into use; and lastly (v) confirmation, which occurs when the individual or other decision-making unit seeks reinforcement for an innovation-decision that has already been made, while he or she may reverse this previous decision if exposed to conflicting messages about the innovation (Rogers 1995). The innovation-decision process (Rogers) is graphically presented in Figure 2-4.

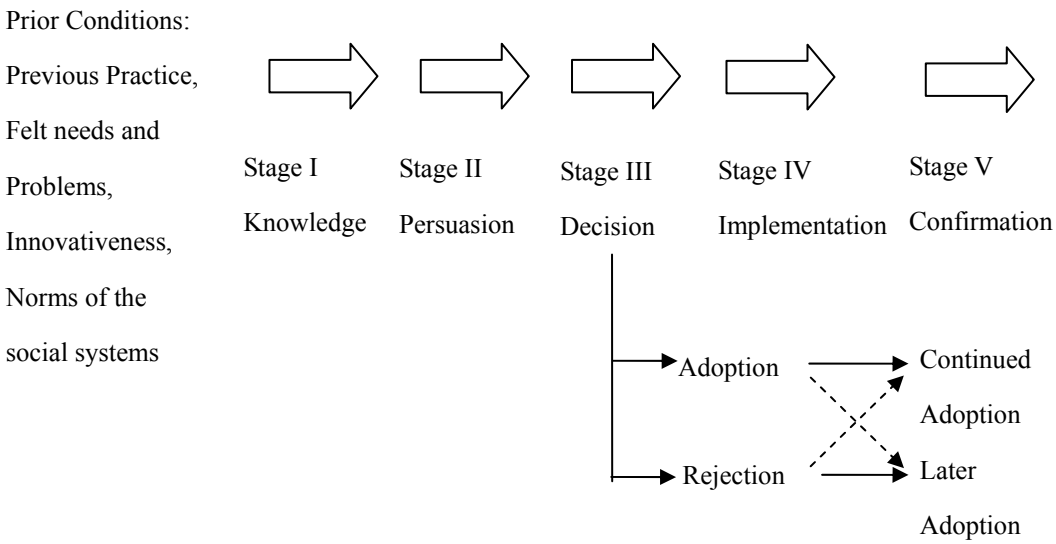

Figure 2-4 The Innovation-Decision Process (Adapted from Rogers 1995)

In many cases, an individual cannot adopt an innovation until an organization has previously adopted it. Compared to the individual innovation-decision process presented above, the innovation process occurred in an organizational context is much more complex (Rogers 1995). Rogers (1995) identifies an organizational innovation process as a sequence of five stages (see Figure 2-5). The first two stages are agenda-setting and matching, which are categorized into "initiation", identified as all of the information gathering, conceptualizing and planning for the adoption of an innovation, leading up to the decision to adopt. The subsequent three stages: redefining-restructuring, clarifying and routinizing are considered as "implementation", which refers to all of the events, actions and decisions involved in putting an innovation to use.

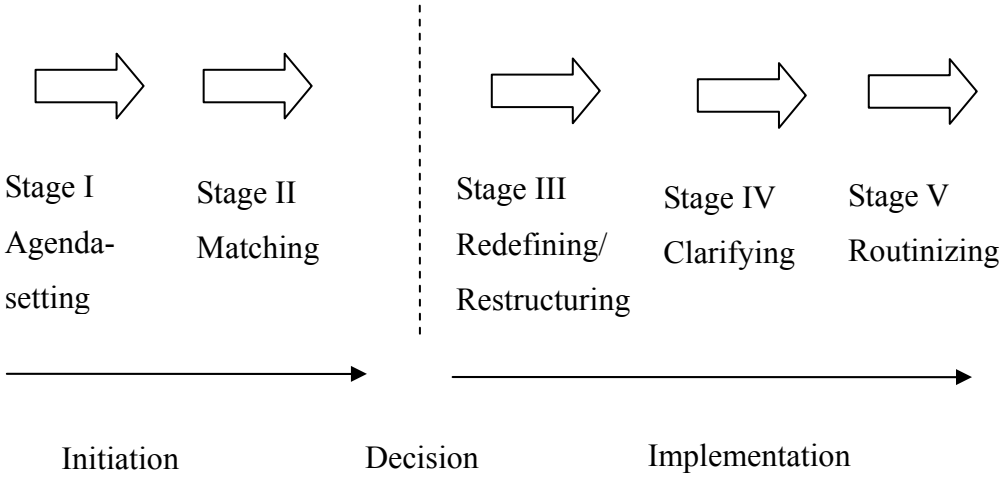

Figure 2-5 The Innovation Process in Organizations (Adapted from Rogers 1995)

In organizations, agenda-setting occurs when a general organizational problem is defined that creates a perceived need for an innovation (Rogers 1995). Matching is the stage in which the problem from the organization's agenda is fit with an innovation, and this match is planned and designed (Rogers 1995). After the matching decision marks, which is the watershed in the innovation process between initiation and implementation, redefining/restructuring occurs when the innovation is re-invented so as to accommodate the needs of the organization more closely and the organizational structure is modified to fit with the innovation (Rogers 1995). Clarifying indicates that the innovation has been put into more widespread use in an organization, and thus the meaning of the new idea gradually becomes clearer to the members of the organization. Finally, routinizing occurs when an innovation has been incorporated into the regular activities of the organization and turned into on ongoing elements in the organization (Rogers 1995).

The "social system" feature in Innovation Diffusion is defined as "a set of interrelated units that are engaged in joint problems solving to accomplish a common goal (Rogers 1995). The members or units of a social system may be individuals, informal groups, subsystems or organizations. In this study, the social system refers to the life insurance organizations in which the concepts and applications of knowledge management is diffused.

Linking the perceptions of innovations and the beliefs about the behavior in the TRA, Moore (1987) proposes an Innovation Decision Model (see Figure 2-6), in which external variables, e.g., communications network, personal characteristics of adopter, objective characteristics of innovation and objective characteristics of precursor, are suggested to have impact on the behavior of adoption/rejection through subjective norm and attitude, as well as innovation decision.

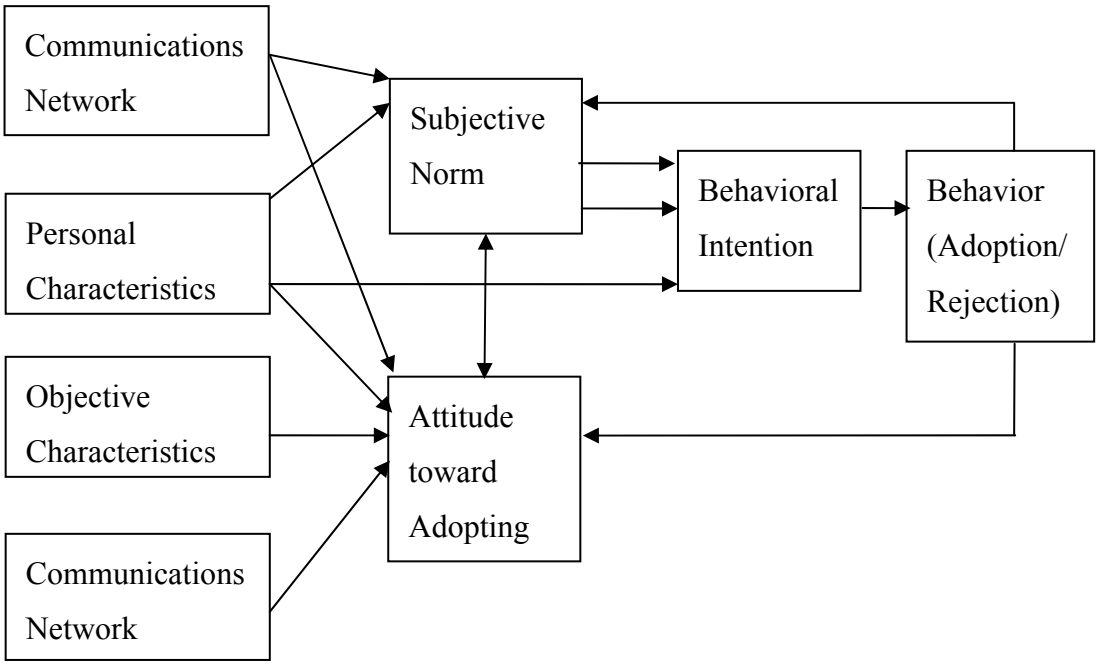

Figure 2-6 The Innovation Decision Model (Moore 1987)

Moore and Benbasat (1991) claim that the "relative advantage" attribute in Innovation Diffusion is similar to the "perceived usefulness" in the TAM, and "complexity" of ID is comparable to the "perceived ease of use" in the TAM model. In addition to relative advantage and complexity, other characteristics of innovations, including compatibility, result demonstrability, visibility, image and trialability, are identified and empirically demonstrated to have effect on the behavior of adoption. The research of Agarwal and Prasad (1997) posits the individual's perceptions about the characteristics of the target technology as the explanatory and predictive variables for acceptance behavior. The results of the empirical study indicate that innovation characteristics, e.g., relative advantages, ease of use, compatibility,

trialability, visibility, result demonstrability and image, have impact on two acceptance outcomes, which are current use, i.e., initial use of an innovation, and future use intention, namely, intention to continue such use in the future (see Figure 2-7).

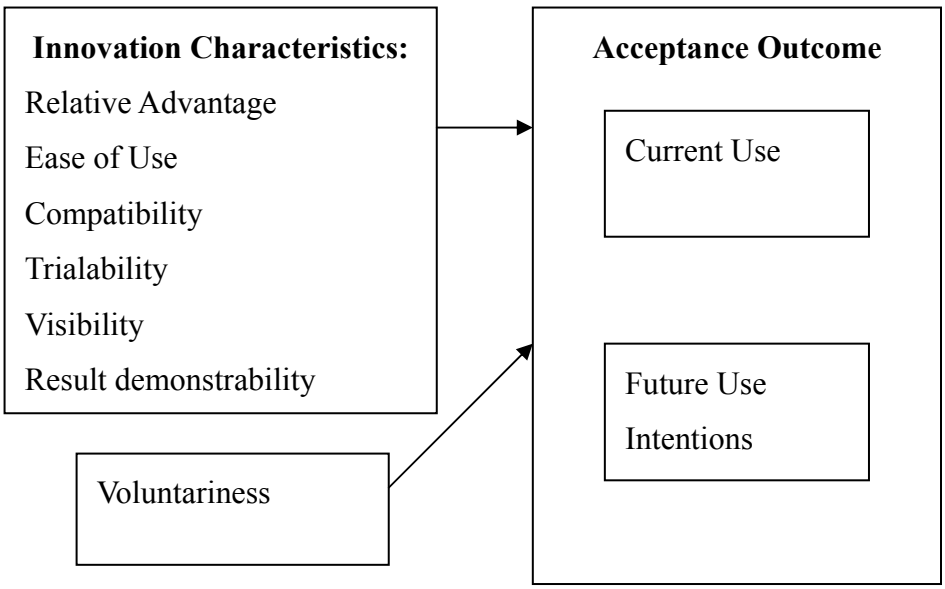

Figure 2-7 Agarwal and Prasad's (1997) Research Model

Extending the innovation diffusion models, Thong (1999) examined the adoption of technology at the organizational level and found organizational contextual factors to be significant. Thong (1999) explored the adoption of information system among small businesses in Singapore and developed an integrated model. The model specified Chief Executive Officer (CEO) and information system (IS) characteristics for their small business context and innovation-type information systems. The findings of Thong (1999) revealed that the CEO, IS and organizational characteristics were significantly associated with adoption.

Diffusion of innovation has been widely investigated by numerous researchers in various areas (Baptista 1999; Quaddus 1995; Rai, Ravichandran & Samaddar 1998; Xu 2003). The literature within the field of Innovation Diffusion spans several applications, including administrative innovation diffusion (Teece 1980), diffusion of high-tech products (Norton & Bass 1987), new IT technology adoption/diffusion (Carter et al. 2001; Huff & Munro 1985), Intelligent Telephone (Manross & Rice

1986), telecommunication technologies (Grover & Goslar 1993), Electronic Data Interchange (EDI) (McGowan & Madey 1998), internet (Rai, Ravichandran & Samaddar 1998; Wolcott et al. 2001), electronic commerce (Kendall et al. 2001), knowledge management system (Xu & Quaddus 2005), among many others.

However, there is a genuine lack of literature on the adoption and diffusion of knowledge management, particularly in the life insurance industry domain. Yang (2004) suggested that the concepts and propositions of Innovation Diffusion should be applied in the life insurance companies to create more business value. The theory of Innovation Diffusion does not only provide a general picture of the processes by which new ideas or practices are adopted and distributed through social systems over time, but also identify the patterns of behaviors at both individual and organizational levels. As a result, it is considered appropriate in this research to employ the theory of Innovation Diffusion in explaining the phenomenon of knowledge management adoption and practice, which involves changes of thoughts and operation procedures, in the life insurance industry in Taiwan.

2.4 Summary

Knowledge management has rapidly become an integral business function for many organizations as they realize the competitiveness hinges on effective management of intellectual resources (Grover & Davenport 2001). Through reviewing the literature on knowledge and knowledge management, it is indicated that knowledge-based resources are essential for providing sustainable competitive advantages since they are inherently difficult to imitate and thus facilitate sustainable differentiation (Alavi & Leidner 2001). Moreover, the knowledge and associated approaches to manage such knowledge of an organization depend on the organizational particular experience and expertise. To create long-term sustainable competitive advantages, organizations should identify their knowledge and the appropriate methods to leverage the knowledge. However, there was found to be a gap in the literature on the area of knowledge management adoption and applications in the life insurance industry.

A core set of theories explaining the innovation adoption behavior and diffusion processes are used as the background to investigate the adoption and dissemination

of knowledge management in Taiwan life insurance industry. The core theories are the Theory of Reasoned Action (Ajzen & Fishbein 1980), Technology Acceptance Model (Davis 1986) and Rogers's (1995) Innovation Diffusion. These theories were suggested from a range of disciplines, with each focusing on different aspects of innovation progression. The TRA provides the foundation that a person's behavior, e.g., knowledge management adoption and implementation in this study, is affected by the attitudinal factor and subjective norm that are influenced by the person's beliefs regarding the behavior. The TAM model further identifies that usage of a new system is decided by perceived usefulness and perceived ease of use, which could be affected by several external factors. The theory of Innovation Diffusion re-emphasizes the role of social system in influencing an individual in accepting an innovation, and suggests that the complexity perceived concerning the innovation will have significant impact on the individual's adopting behavior. Moreover, the processes involved in the diffusion of an innovation at both individual and organizational levels are well explained in Innovation Diffusion.

The review provides the basis for developing a theoretical model that will guide the investigation of the factors affecting knowledge management adoption and practice. Nonetheless, since the context of this study is the life insurance industry in Taiwan, there is a necessity to identify the external factors that affect people's beliefs and explore how the practice of knowledge management would influence the organizational performance in the setting of Taiwan life insurance industry. Hence, the following chapter will discuss the unique features to reinforce the research model by presenting an overview of the life insurance industry and knowledge management studies in Taiwan.

Chapter 3 THE LIFE INSURANCE INDUSTRY AND KNOWLEDGE MANAGEMENT IN TAIWAN

3.1 Introduction

Few empirical knowledge management studies have been made in the specific context of life insurance business. Nonetheless, there has been a great deal of research investigating the applications of knowledge management in various industries in Taiwan. This chapter first provides an overview of the evolution of life insurance business and its significant role in Taiwan. This is followed by an examination of the knowledge management studies conducted in Taiwan and highlighting some particular factors affecting the implementation of knowledge management in Taiwan's organizations. Finally, why the life insurance business has been calling for knowledge management and how it recognizes the value of knowledge management are further discussed.

3.2 The Development of Taiwan Life Insurance Industry

The life insurance industry has been developing exponentially and playing a

significant role in the financial industry in Taiwan. According to "The Important Indexes of Insurance Industry, Taiwan" (Taiwan Insurance Institute 2006), the total asset of Taiwan life insurance industry in 2005 was NT$ 6,573,797 million or 17.50% of the total assets of financial institutions nation wide, with an annual growth rate of 19.50%. Over the last ten years, the life insurance industry in Taiwan has grown rapidly and its total assets have increased greatly as presented in Figure 3-1. The population of household registered in Taiwan up to 2005 was 22.770 million, and the ratio of life insurance policies to population was 176.13 %. It indicated that, in average, there were 1.76 life insurance policies in force for each person among the 22.770 million people in Taiwan. The income from premiums of Taiwan life insurance industry in 2005 was US$ 38,808 million and ranked top 9 globally. Due to the enormity of premium income, which is predominantly from the general public, and the associated social responsibility, the life insurance companies aim at providing better professional knowledge and services to achieve superseding competitive advantages.

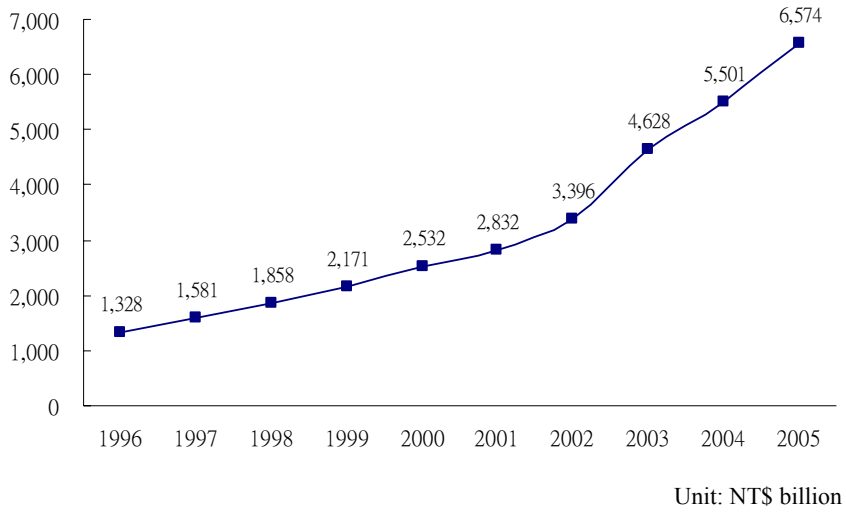

Figure 3-1 Total Assets of Taiwan Life Insurance Industry from 1996 to 2005

The life insurance industry in Taiwan in the early stage was imposed several restrictions by the government (Hsiao 2003). In 1947, the first two life insurance organizations were established and owned by the government to operate insurance in accordance with its policies. The life insurance market was opened for private

organizations in 1962. In the 1960s, there were only eight life insurance companies and it was a "seller market", in which most of the life insurance enterprises emphasized on the increase of premium income and the sales growth, paying little attention to the customer rights and service quality (Hsiao 2003). It was not until 1987 that the government approved foreign insurance companies to launch their operation in Taiwan. Since then, the life insurance enterprises in Taiwan have started to face a variety of challenges, such as enhancement of image, rapid and correct procedures for claim, as well as thoughtful and high-quality customer services (Lu 2002). Opening the market to foreign companies forced the original life insurance enterprises to reform and highlight the role of customers and their demands. Several life insurance companies thus initiated to make efforts to update information systems and provide a range of trainings for their employees to enhance customer services (Hsiao 2003).

According to the Article 136 of *Insurance Law,* business organizations other than insurance enterprises shall not engage concurrently in the insurance business or a business similar to insurance in Taiwan. The Article 6 of *Insurance Law* regulates that "insurance enterprise" are entities that are engaged in insurance business and organized and registered pursuant to the Insurance Law, and "foreign insurance enterprise" are those organized and registered pursuant to foreign law, having approval from the authority to be engaged in the insurance business in Taiwan. In the practical operation, "insurance enterprises" are called "local insurance companies" and "foreign insurance enterprises" are called "foreign insurance companies" respectively. In accordance with the Article 13 of *Insurance Law*, local and foreign life insurance companies cannot only operate life insurance, but also accident insurance, health insurance and annuities in Taiwan.

In 2001, the government passed the Financial Holding Company Act, which provided the legal schemes for the financial industry, such as banking, insurance and security companies to coordinate and operate across different financial sectors (Lu 2002). The act led to an extensive financial reform since all of the financial products, such as insurance policies, stocks and bonds, could be purchased at the same time in a financial institution (Lu 2002). In other words, the life insurance companies did not

only have competitive pressure from other life insurance enterprises, but also from the other institutions, such as banks and security brokers. Lu (2002) suggested that the life insurance industry should employ innovations in product designing, strengthen information systems and pay attention to customer services, in order to increase its competitive competency under the impact of the Financial Holding Company Act.

Furthermore, Taiwan officially became a member of the World Trade Organization (WTO) in 2002 (Insurance Bureau 2005). Accordingly, the Ministry of Finance (MOF) took initiatives in many administrative policies to enable the insurers to participate in the global market more actively and to speed up the modernization of Taiwan life insurance market. These initiatives include: amendment of insurance regulations, supervision on insurance agents, brokers and surveyors, as well as implementation of information disclosure clause to strengthen information transparency and protect public interests (Insurance Bureau 2005). Facing the ever-changing global economic situation and tough international insurance market, the traditional life insurance industry should aim to improve operational efficiency via innovative strategies, reinforce facilitating systems and focus on service quality management, and then the competitive advantages could be enhanced (Lu 2002).

The Department of Insurance indicated that the life insurance business had been gaining its significance more than ever in the financial industry in Taiwan (Insurance Bureau 2005). The potentiality of Taiwan life insurance business was promising because of its continuous evolution (Insurance Bureau 2005). There are currently twenty-one local life insurance companies and eight foreign life insurance companies operating life insurance, accident insurance, health insurance and annuity business in Taiwan (Taiwan Insurance Institute 2006).

3.3 Relevant Studies of Knowledge Management in Taiwan

The applications of knowledge management have investigated empirically in Taiwan across a range of settings by several researchers, including Chou (2001), Hung (2004), Hung et al. (2005), Lin (2001), Wang (2004), Wang, Chia-Hung (2002), Wang, Tsai-Pai (2002), Wu, Chia-Chun (2004), Wu, Hui-Hsuan (2004), Yang (2004),

among many others. The following review of the relevant studies conducted in different areas, such as high-tech, manufacturing and financial institutions, presents a representative picture of the pragmatic knowledge management applications in the organizations of Taiwan.

Surveying among the top 1000 major corporations, divided into high-tech industry, conventional industry and financial industry, in Taiwan, Chou (2001)'s study revealed the following main findings: (i) more than 50 % of the major corporations were currently involved in knowledge management; (ii) the applications of knowledge management in business usually began with internal logistical operations and was generally conducted by IT divisions; (iii) the majority of the corporations carried out their KM activities via traditional education and training approaches; (iv) the corporations were still in lack of systematic KM technical tools; (v) the high-tech industry showed significant association between KM and performance, whereas no significant relationship was found for the conventional industry, and the financial industry were found to have little knowledge management in their practical operations; and (vi) the implementation of knowledge management is contingent upon the characteristics of the core value of individual corporation. Chou (2001) concluded that the corporations should choose the appropriate tools to facilitate the implementation of knowledge management via four aspects, including people, procedure, content and technology, to achieve the goal of performance enhancement.

Wu, Chia-Chun (2004) investigated the relationships among knowledge management strategies, knowledge management system and the performance of the organization in the high-tech industry. The findings revealed that there were significant variations in knowledge management strategies among different types of high-tech industries. The computer and its peripheral industry, optics industry and precision instrument industry tended to adopt systematic knowledge management strategies, while semiconductor and communication industries tended to use individualized strategies. Systematic knowledge management strategies were shown to result in better performance in organizational efficiency, product quality, innovativeness and the ability to respond to customers. Besides, the characteristics of knowledge management system, such as information accumulation, knowledge sharing,

technique learning and knowledge applications, were found to have positive impact on the organizational performance. The Ministry of Economics listed knowledge management as one of the core competencies for organizations and knowledge management became a popular topic in the business world (Wang, Tsai-Pai 2002). Wang, Tsai-Pai (2002) explored the effects of knowledge management culture on corporate efficiencies in high-tech industries and obtained some findings as follows: (i) the characteristics of an organization would have impact on its knowledge management culture; (ii) knowledge management strategies played an moderating role in the relationship between knowledge management culture and knowledge management performance; and (iii) knowledge management performance were shown to have positive effects on the organizational performance.

With the advent of the knowledge-based economy, the enterprises increasingly realized that it was knowledge capital, such as intelligence and innovation, to create sustained competitive advantages (Lin 2001). In putting knowledge management into place, Lin (2001) recommended that the enterprises should look at both operation and products aspects and the China Steel Corporation was advocated to be the pioneer implementing knowledge management in Taiwan. Conducting both quantitative survey and qualitative case study among the professional engineers in the China Steel Corporation, Lin (2001) empirically verified that the implementation of knowledge management, e.g., knowledge accumulation, knowledge transfer and knowledge diffusion, had impact on the engineers' core competences, which in turn affect their job performances. Exploring the scope of knowledge management applications in the biotechnology industry in Taiwan, Wu, Chi-Min (2003) surveyed 948 biotechnology institutions in Taiwan and verified that knowledge management strategies have indirect influence on business performance through their impacts on organizational core competence.

Extending the scope of empirical knowledge management research to the sector of manufactures in Taiwan, Wu, Hui-Hsuan (2004), through a survey among 600 Taiwan manufacturers, commanded that the main knowledge management mechanisms among the manufactures included: education and training, knowledge transferring and knowledge utilization. The features of knowledge-oriented culture,

such as learning actively, openness, encouragement of experience sharing, harmony and companion, as well as emphasis on innovation, were found to play a significant role in affecting knowledge management performance in the manufacture industry in Taiwan.

Hung et al. (2005), investigating the factors in adopting a knowledge management system for the pharmaceutical industry in Taiwan, identified that seven factors were critical and they comprised: (i) a benchmark strategy and knowledge structure; (ii) the organizational culture; (iii) information technology; (iv) employee involvement and training; (v) leadership and commitment of senior management; (vi) a learning environment and resource control; and (vii) evaluation of professional training and teamwork. It was reported by Hung et al. (2005) that Taiwan Pharmaceutical industry had paid special attention to the "benchmark strategy" by using the experience of successful companies as a blueprint strategy in the adoption of a knowledge management system. Besides, Hung et al. (2005) emphasized that, even though adopting a knowledge management system could easily begun with a core department to maintain its function, the employees should be fully involved in utilizing the precious intangible assets available through such a knowledge management system. It was suggested that a good knowledge management system should be promoted in the proper manner, e.g., teaching the employees how to enhance productivity via using the system, so that the end-users could fully understand the benefits that such a system brought to them.

Chou (2001) pointed out that the phenomenon that the financial industry in Taiwan was generally in lack of specific knowledge management methods and techniques. Little research attention has been paid to the financial sector until recently. Wang (2004) conducted an empirical investigation among 47 commercial banks in Taiwan and categorized their knowledge management applications into three styles: active, moderate and passive. Commercial banks with active knowledge management applications refer to those banks which can lay emphasis on both explicit and tacit knowledge. Moderate knowledge management application implied the banks simply recognize part of their explicit and tacit knowledge. Passive banks in applying knowledge management meant that they had little knowledge regarding

how to manage explicit and tacit knowledge in their organizations. The knowledge management styles were shown to have impact on the business performance among the commercial banks. Wang (2004) recommend that the commercial banks should actively exploit knowledge management via several approaches, such as utilizing information technologies and encouraging knowledge sharing, to improve their business performance.

Recognizing the worth of knowledge management upon the life insurance business, Yang (2004), via case studies, introduced two life insurance companies' practical operation in applying knowledge management. The two companies were chosen since they represented the leading companies in local life insurance companies and foreign life insurance companies respectively. Despite the fact that various organizations have employed knowledge management extensively to increase their competitive competencies, the applications of knowledge management are varied according to the characteristics of different industries (Yang 2004). Yang (2004) indicated that the utilization of knowledge management was no longer limited in the high-tech or manufacture industries, and the service industry had commenced investments in establishing knowledge management mechanisms. The life insurance business was highly associated with people, and "services" were the main gear to retain its customers and incur new insurance policies. Therefore, how to effectively manage knowledge to provide quality services would be a critical issue among the life insurance enterprises (Yang 2004). Under the framework composed of two main facets, i.e., culture and information technology, the findings of Yang (2004) are summarized in Table 3-1.

Table 3-1 Knowledge Management Practice of Two Life Insurance Companies

Facet		**Similarity**	**Difference**	
		Case A & Case B	**Case A**	**Case B**
Culture	Organization Objective	1.Reforming the internal mechanism 2.Developing web technology 3.Developing operation	1.Long-term 2.Creativity	1.Zero-distance service 2.Transparency of operation process

		information system 4.Customer oriented 5. Multi-operation		
	Consensus	1.Issuing book and DM 2.Emphasis on learning 3.Mission and acknowledgement	1.Internal news 2.Morning meeting	1.Web usage 2.Seminar
	Strategy	1.Decision made by top management 2.Implemented initially by the operation department 3.Keeping quality employees via promotion system	1.Up to down 2.Emphasis on sales performance	1.Open discussion among the employees 2.Meeting the needs in operation
IT	Gathering	1.Training 2.Faciliating materials 3.Comprehensive and immediate 4.Active	1.”Satellite News” 2. In-time customer service system	1.Electronic data base
	Storage	1.Operation report 2.Video, tape, CD 3.Feedback	1. “Customer Family Card” 2.Data base system	1.E-agent platform
	System	1.Exclusive web platform 2.The goal of no-paper office	1.CSN video system 2.Web college 3.Service message diffusion 4.Operation system	1.Marketing supporting database system 2.Support of administration department 3.Monthly publication

				4.Decreas of labor in operation
	Learning	1.Training pre work 2.Training at work 3.Mentor system 4.Flexible	1.Learning web 2.Strategic alliance 3.Academic exchange 4.Group learning	1.Web college 2.Emphasis on individual learning 3.More freedom
	Analysis	1.Operation diary 2.Maintaining good relations and interactions with customers	1.Proposal 2.Analysis	2.Policy design
	Sharing	1.Long-Term Relationships 2.Open Discussion 3.Trust	1.Inviting outstanding workers to share their experience 2.Reducing the turnover rate 3.Sharing experience in failure 4.Recognizing of self-esteem	1.”Operation Diagnosis” 2.Evaluation 3.Competition 4.Short meeting

	Innovation	1.Interactive system 2.Efficient operation 3.Rapid service 4.Innovative product	1.”24 hour Customer Service Centre” 1.”Contact Centre”	1.”24 hour Call Service Centre” (having both service and sales function) 2.”Web Service Centre” 3.Net Meeting

(Adapted from Yang 2004)

It can be observed that the two leading companies in Taiwan life insurance industry have been making efforts to exploit knowledge management in their practical operation. The suggestions offered by Yang (2004) included that: (i) the life insurance companies mostly stressed the establishment of knowledge management system, but the recognition among the employees had not been reached extensively; (ii) there were close relationships among the employees and sales persons in the life insurance industry, and such relationships were helpful for the organizations to promote knowledge management activities, e.g., knowledge sharing and knowledge acquisition; (iii) the impact of knowledge management on the life insurance companies was “invisible” in a short time. It would be difficult to put knowledge management into practice in a life insurance company if the leaders were deficient in the vision for the long run; (iv) most of the knowledge management projects were implemented via designating personnel from different departments, instead of setting up an exclusive knowledge management division. In general, the knowledge management projects simply lasted for a short period of time and could hardly result in significant performance; and lastly, (v) though the life insurance companies had commenced utilizing information technology to strengthen their competitive competency, they needed to adopt innovative strategies and methods to create their business value.

The relevant empirical studies on knowledge management undertaken in Taiwan are

summarized and presented in Table 3-2. Although the issues of knowledge management have drawn numerous researchers and managers' attentions, there is little comprehensive research available to examine the overall acceptance and applications of knowledge management in the life insurance industry in Taiwan. In addition, most of the empirical studies in Taiwan centre the subjects of strategies associated with knowledge management and their effects on performance. Few studies were found to investigate the external factors that could affect the adoption and practice of knowledge management via employees' perceptions. However, the preceding review identifies the significance of knowledge management strategies/mechanisms and their influences on performance, as well as reveals a list of factors affecting knowledge management applications in a context of the organizations in Taiwan. Therefore, in proposing a research model that draws on the Theory of Reasoned Action (Ajzen & Fishbein 1980), Technology Acceptance Model (Davis 1986) and Innovation Diffusion (Rogers 1995) as described in Chapter 2, this study will incorporate these factors and propositions extracted from the knowledge management research that has been empirically tested in Taiwan.

Table 3-2 Empirical Studies on Knowledge Management Undertaken in Taiwan

Industry	Main Findings	Reference
High-tech, conventional and financal industries	1.Over 50 % of the major corporations were currently involved in KM. 2.KM applications usually began with internal logistical operations. 3.KM activities were mostly carried out via traditional education and training. 4.The corporations lacked systematic KM technical tools. 5.The relationship between KM and performance was found to be significant in the high-tech industry, whereas insignificant in the conventional industry; little KM was found in the financial industry' practical operations.	(Chou 2001)

	6. KM implementation was reliant on the core value of individual corporation.	
High-tech	1.The characteristics of an organization would affect its KM culture. 2.KM strategies played an moderating role in the relationship between KM culture and KM performance. 3.KM performance had positive effects on the organizational performance.	(Wang, Tsai-Pai 2002)
High-tech	1.The computer and its peripheral industry, optics industry and precision instrument industry tended to adopt systematic KM strategies, whilst semiconductor and communication industries tended to use individualized strategies. 2.Systematic KM strategies resulted in better organizational performance in terms of efficiency, product quality, innovativeness and the ability to respond to customers. 3.The characteristics of a KM system had a positive impact on the organizational performance.	(Wu, Chai-Chun 2004)
Steel	KM implementation, e.g., Knowledge accumulation, transfer and diffusion, would influence the core competences of the engineers, which in turn affected their job performances.	(Lin 2001)
Biotechnology	KM strategies would affet the business performance via their impacts on organizational core competence.	(Wu, Chi-Min 2003)
Manufacture	1.The major KM mechanisms were education and training, K transferring and K	(Wu, Hui-Hsuan

	utilization. 2.Knowledge-oriented culture and the emphasis on innovation were found to significant in affecting KM performance.	2004)
Pharaceutical	The seven critical in adopting a KM system were: a benchmark strategy and knowledge structure, the organizational culture, information technology, employee involvement and training, leadership and commitment of senior managemen, a learning environment and resource control, as well as evaluation of professional training and teamwork.	(Hung et al. 2005)
Banking	The level of KM applications, e.g., active, moderate and passive, among the banks were shown to have impact on the business performance.	(Wang 2004)
Life insurance	1.Most of the attention was paid on developing KM system, while the acknowledgment regarding KM had not been reached among the employees extensively. 2.There was in general a lack of KM divisions that were specifically designed for promoting and implementing KM. 3.The KM projects could hardly result in significant performance in a short time. 4.It would be difficult to put KM into place in a life insurance company if the leaders were short of the vision. 5. Innovative strategies and methods should be adopted to create the business value.	(Yang 2004)

3.4 The Need of Knowledge Management in the Life Insurance Industry

The life insurance industry is an example of a knowledge-based industry with its main products being insurance contracts, which are commitments supported by professional knowledge and services (Hsiao 2003). "People" play an important role in conveying the knowledge and services to the customers in the life insurance industry. Hsiao (2003) declared that life insurance was the greatest invention of human beings to deal with human being's risks. Life insurance can be seen as an arrangement through which the risk of specific individuals can be share by the general majority of people. Different from other industries, the products sold by the life insurance business were comparatively "invisible" and "untouchable" (Hsiao 2003). Besides, most of the life insurance contracts were long term and therefore the life insurance enterprises should provide lasting, sometimes lifelong, services for the customers. As a result, the life insurance industry simply sells "pieces of paper", which is composed of the obligation, image, service and knowledge of the enterprises.

Ranking top one in the life insurance industry in Taiwan, Cathay Life Insurance Company stated (Microsoft, Taiwan 2005) that, "As a giant in the insurance industry, we have been proud of our management and performance. However, we have been in lack of the ability to react to the changes in the contemporary world because our organization is huge and information cannot be transmitted smoothly. This could be a warning that we may lose our competitive advantages." Cathay Life Insurance Company perceived the importance of knowledge management and started its so-called "quiet revolution" by establishing internet environments and asking the top manages, from the office chief to the president, to type at least 20 words a minute and all the departments to have their own website and update regularly (Microsoft, Taiwan 2005). It was claimed that "speed" was the key for business to survive in the extremely competitive environments. Thus, the business web was established to provide in-time "information" and "knowledge" to provide rapid services and draw new contracts. Besides, the employees were allowed to propose any opinions through the web to the top management (Microsoft, Taiwan 2005).

Though the government has gradually released the limitation of capital investment

for the life insurance industry in Taiwan, the Department of Insurance continued monitoring the life insurance business to disclose crucial information pertaining to the public interests, promoted product innovation and diversity, as well as set up a complaint filing system for the customers to protect their rights (Insurance Bureau 2005). Therefore, the life insurance companies are in great need of integrating information and developing systems to meet the requirements of the Department of Insurance. Meanwhile, the swift expansion of product varieties in the past few years had great impact on the life insurance industry in several aspects, such as the raise of paper usage and associated costs, more complicated administration work and increasing demands from the customers (Wang 2005). Wang (2005) suggested that managing knowledge to enhance service quality and performance would be imperative for life insurance companies to gain sustainable competitive advantages (Wang 2005).

Knowledge can be the essential resources for life insurance enterprises to create sustained competitive advantages because it is closely related to specific organizational structure and culture, and intrinsically difficult to imitate (Alavi & Leidner 2001). The individuals in an organization contribute their knowledge based on personal interpretations of information. Group interpretations of knowledge rely on the total members of the group. Moreover, organizational knowledge and its approaches to manage the knowledge are built on the unique history of the organizational own experiences and accumulated expertise (Bollinger & Smith 2001). However, hoards of information or knowledge are of little worth. Both individual and organizational knowledge should be identified, integrated and fully utilized to generate competitive advantages (Alavi & Leidner 1999).

A hallmark of the new economy is the ability of organizations to realize the economic value from their collection of knowledge and the associated assets (Gold, Malhotra & Segars 2001). Despite the competitive necessity of becoming a knowledge-based organization, some managers have found it difficult to "transform" their firms via knowledge management initiatives, especially when their organizations have long histories of development (Gold, Malhotra & Segars 2001). Although numerous companies have launched extensive knowledge management

efforts, many of their projects are simply information projects in reality. When these projects yield some consolidation of data but little innovation in products and services, the value of knowledge management is cast in doubt (Gold, Malhotra & Segars 2001). Yang (2004) indicated that the life insurance companies in Taiwan still had most emphases on information system development. The mission of the life insurance industry to move beyond information management and into knowledge management is a multifaceted undertaking (Gold, Malhotra & Segars 2001) that involves the development of structure and environment in which knowledge can be recognized, created, distributed and used efficiently.

Effective knowledge management has been considered to be crucial for the success of contemporary organizations (Becerra-Fernandez & Sabherwal 2001). Even so, Davenport (1996) argued that effective knowledge management requires investment of money or labor. While knowledge is an asset to create business value, investment of others assets are unavoidable in many knowledge management activities, such as knowledge creation, i.e., gathering documents and moving documents onto computer systems, knowledge distribution, which involves developing information technology infrastructures and applications, and knowledge utilization via educating employees to share and use knowledge. For the life insurance industry, the benefits of knowledge management are hardly shown immediately on the financial indicators, e.g., sales growth and market share (Chou 2001). If the managers perceive nothing valuable resulting from implementing knowledge management, it is hard to launch knowledge management initiatives in the life insurance companies. As suggested by Davenport (1996), there should be astute managers who acknowledge and cultivate knowledge policies. The knowledge champion in life insurance companies will need to encourage influential "opinion leaders" as early adopters of knowledge management and, deal with those who have knowledge and those who use it, and at the highest level, try to shape the governance of knowledge to better utilize it across the organization.

In comparison with other business, the life insurance industry in Taiwan can be seen as in the infant stage of knowledge management applications. Therefore, learning from others' experiences and realizing the potential obstacles would be valuable for

the life insurance enterprises which attempt to commence knowledge management in their organizations. Besides, the firm wishing to effectively manage knowledge needs a heavy does of human labor (Davenport 1996). While computers and new technologies are good at capturing, transforming and distributing highly structured knowledge that changes rapidly, human beings are quite accomplished at certain knowledge skills, such as interpreting knowledge within a broader context, combining knowledge with other types of information and synthesizing various unstructured forms of knowledge (Davenport 1996). Similarly, employees still play important roles in the life insurance industry and their cooperation and attitude would be critical in deciding whether the organizations could successfully put knowledge management into place or not. Accordingly, to realize why the managers and staff would or would not accept knowledge management and how their attitude affect knowledge management applications, as well as how the practice of knowledge management could influence the organizational performance, would help the development of a comprehensive research model in the knowledge management literature, as well as provide valuable suggestions particularly for those life insurance enterprises initiating or boarding on knowledge management in Taiwan or elsewhere.

3.5 Summary

This chapter presented the rapid development of Taiwan life insurance industry, as well as its demand for knowledge management techniques over the past few years. The government's opening the market to foreign insures and Taiwan's entering the World Trade Organization accelerate the globalization and modernization of the life insurance business in Taiwan. With a great deal of premium income and plenty of assets, the life insurance industry has been playing a substantial role in the financial business in Taiwan. However, the adoption and related applications of knowledge management have not been well explored among the life insurance enterprises in Taiwan. This chapter discussed how knowledge management schemes were employed in Taiwan's organizations and what benefits that implementing knowledge management could generate for the organizations. It was identified that the appliances of knowledge management in Taiwan generally initiate with logistical operations and executed by IT sectors. The approaches and relevant strategies of an organization to promote knowledge management, as well as the culture factors were

suggested to have influence on the organizational performance via the practice of knowledge management. Accordingly, environments, information technology, knowledge management promotion, organizational features and cultural variables were identified to be the external factors that affect the adoption and practice of knowledge management through perceptive factors, particularly for the life insurance industry in Taiwan. Meanwhile, the previous empirical studies indicated that effective knowledge management could result in better organizational performance in terms of efficiency and competency. These presentations extended the research framework that was developed on the basis of the three primary theories presented in Chapter 2. A detailed discussion of the overall conceptual framework and the tentative research model will be presented in the subsequent chapter.

Chapter 4 CONCEPTUAL FRAMEWORK AND TENTATIVE RESEARCH MODEL

4.1 Introduction

On the foundation of the theories described in Chapter 2 and the discussions in Chapter 3 regarding the unique features of knowledge management applications and the life insurance business in Taiwan, this chapter presents the research conception in this study and proposes the preliminary research model. The first section describes the conceptual framework of the research. This is followed by a presentation of the tentative research model and its associated factors. Definitions of the terms used in the research model are provided in the last section. It is noted that this chapter primarily describes the constructs and their meanings. The links (paths) of the research model have been justified while developing the hypotheses in Chapter 7.

4.2 Conceptual Framework

Given the fact that knowledge management is extensively applied in organizations, the issue of knowledge management has not been well explored by the researchers in the life insurance industry. Although the knowledge management literature has been enriched from several disciplines, e.g., philosophy, sociology and computer

science (Earl 2001), little comprehensive research is found to be available to examine the perceptions that may affect the adoption and applications of knowledge management. This study attempts to fill this gap by investigating how the employees in Taiwan life insurance industry think of knowledge management and the factors affecting its adoption and practice.

This research, via extensive literature review of knowledge, its management and three grounding theories, as well as discussions of the life insurance industry and knowledge management applications in Taiwan, proposes that, some external factors influence the perceptions about knowledge management, which in turn affect people's attitudes toward KM adoption, and knowledge management practice would be influenced by such attitudes and affect the perceived performance of the organization. The research framework can be outlined as follows: "External Factors"→ "Perceptive Factors" → "Attitude"→ "Knowledge Management Practice"→ "Perceived Performance".

The conceptual framework is proposed based on the Theory of Reasoned Action (TRA) (Ajzen & Fishbein 1980), Technology Acceptance Model (TAM) (Davis 1986), and the theory of Innovation Diffusion (ID) (Rogers 1995). As discussed earlier in Chapter 2, the TRA postulates that people's behaviors will be affected by attitudes that are decided by beliefs and subjective norm. The TAM model suggests that perceived usefulness and perceived ease of use will have impacts on an individual's adoption or usage of a new system. Yang (2004) reported that most of the life insurance companies in Taiwan focused on information system in embarking on knowledge management. Therefore, the TRA and TAM were considered plausible to understand the adoption and practice of knowledge management in the life insurance industry in Taiwan. Besides, adoption and applying knowledge management is a relatively new phenomenon among Taiwan life insurance enterprises. Accordingly, knowledge management is viewed as an innovation in this study. Hence, knowledge management adoption and practice in Taiwan life insurance industry can be viewed as the processes of adoption and diffusion of an innovation among the life insurance enterprises in Taiwan. The suggestions of Innovation Diffusion (Rogers 1995) provide the foundation of the processes of

knowledge management adoption and diffusion involved at both individual and organizational levels.

Based on the theory of Innovation Diffusion (Rogers 1995), knowledge management adoption and practice in the life insurance industry includes the innovation processes in organizations as well as the innovation-decision process of individuals. According to Rogers(1995), innovation-development process consists of all the decisions and activities, and their impact, that occur from recognition of a need or a problem, through research, development, and commercialization of an innovation, through diffusion and adoption by users, referring to the employees in this research, to its consequences. As a result, in having knowledge management in the life insurance industry, it is generally initiated by the organizations by recognizing the needs or problems, having done some research, developing knowledge management plans or projects, and transmitting the concept and value of knowledge management. However, in adopting and diffusing knowledge management, the organizations would need the employees to implement the activities and processes associated with knowledge management. Hence, the employees' attitude toward knowledge adoption and their cooperation in conducting knowledge management activities would be essential to produce the performance for the organization.

Ajzen and Fishbein (1980)'s Theory of Reasoned Action (TRA) and Davis's (1986) Technology Acceptance Model (TAM) provide the theoretical framework to identify the external factors and perceptive factors that influence the applications of the knowledge management through attitudinal influences. The innovation-development process in the theory of Innovation Diffusion (ID) (Rogers 1995) specifies that the adoption and practice of knowledge management in the life insurance industry is preceded initially by organizational innovation adoption and diffusion, followed by the individuals' adoption and implementation of knowledge management, which would thus result in the consequences of innovation, i.e., the perceived performance for the organization in this study.

4.3 Tentative Research Model of KM Adoption and Practice

The tentative research model is proposed based on the conceptual framework

described above. Figure 4-1 presents the tentative research model of knowledge management adoption and practice. A detailed discussion will be provided in the following sections.

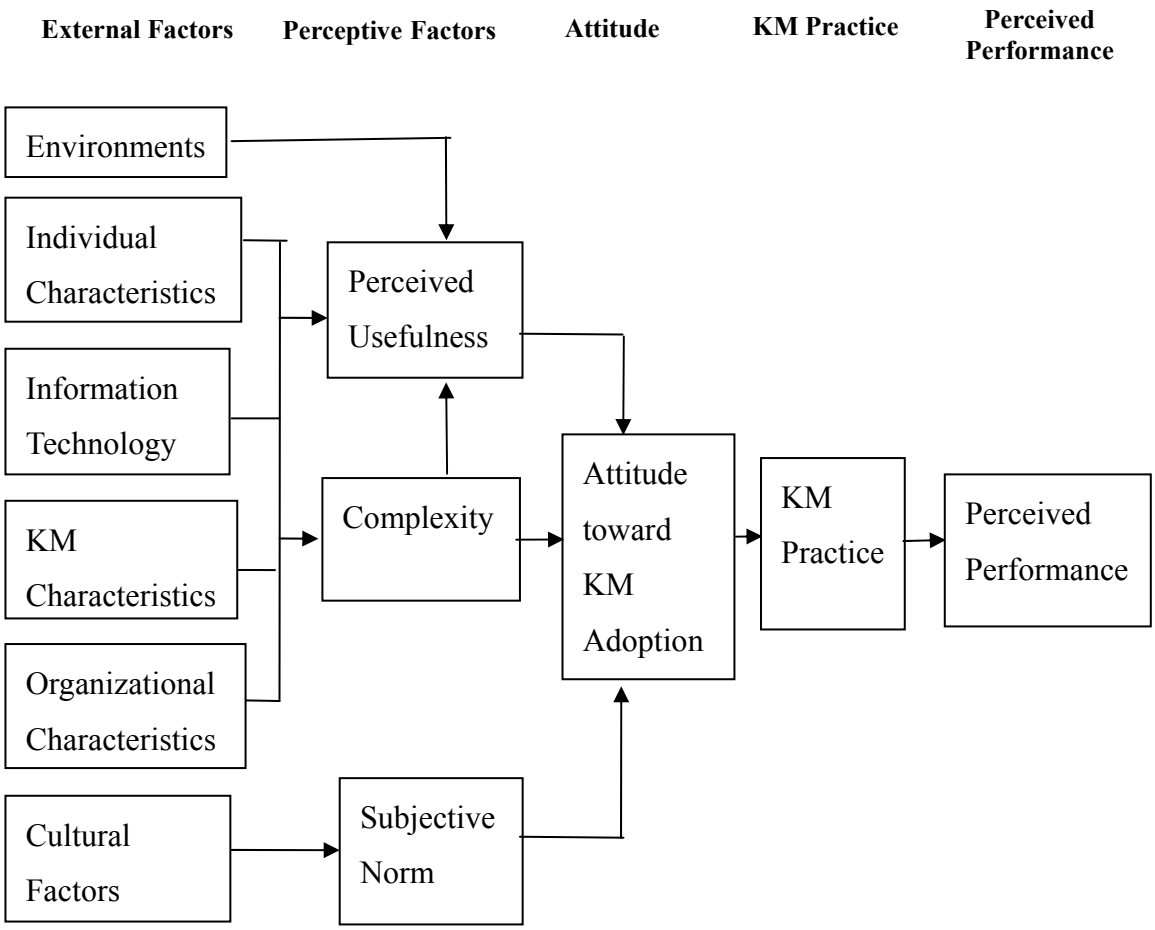

Figure 4-1 Tentative Research Model

4.3.1 External Factors

The TRA model (Ajzen & Fishbein 1980) posits that external variables, such as demographic variables, attitude toward target and personality traits, would affect intentions and behaviors indirectly through behavioral beliefs, outcome evaluations, normative beliefs, motivations to comply, or the attitudinal and normative components. Further, the TAM studies (Davis 1986; Davis, Bagozzi & Warshaw 1989; Igbaria, Guimaraes & Davis 1995; Szajna 1996) recognize that individuals,

system design features and organizational characteristics could be the external variables that have influences on the behaviors (i.e., acceptance and usage) through beliefs (i.e., perceived of usefulness and perceived ease of use) and attitudes. Both TRA and TAM models provide a base for this research with the external variables as the causes of perceptions. Davis (1993) stated that future research should examine the motivational construct, similar to "subjective norm" in the TRA, system familiarity or experience, top management, user involvement and task characteristics, etc., to be the role of addition variables within TAM. Moreover, Lin and Lu (2000) extended TAM by using information system quality and system accessibility as the influences on a user's perception. Therefore, this study attempts to explore the external factors that may affect the employees' perceptions in adopting and implementing knowledge management.

In this study, environments are suggested to have impacts on perceived usefulness. The antecedents of perceived usefulness and complexity are: individual characteristics, information technology, knowledge management characteristics and organizational characteristics. Besides, the research attempts to identity the influence of cultural factors on subjective norm. The specification of the external factors will be presented below.

4.3.1.1 Environments

Environments have been identified to have influences on the adoption of innovations (Belassi & Fadlalla 1998; Grover 1993; Holsapple & Joshi 2000; Lee 1998; McGowan & Madey 1998). Grover (1993) indicated that environment factors, including industry variables, as well as customer demands and tastes, might influence the adoption of a new system. Industrial and environmental influences were identified as one of the four major determinants in Flexible Manufacturing System (FMS) diffusion (Belassi & Fadlalla 1998). Holsapple and Joshi (2000) pointed that environmental influences, e.g., fashion, markets, competition, technology, time, as well as governmental, economic, political, social and educational climate, played an essential role in the success of knowledge management in organizations. In applying knowledge management strategy in the case of life insurance industry, Hung, Hui-Shu (2003) addressed that organizations should consider external

environmental changes and the customers' demands to ensure their abilities to gain the sustainable competitiveness in the market. Under the pressure of low interest rate, the life insurance enterprises in Taiwan were encouraged to develop variable products to maintain their financial solvency (Chen, Shih-Wen 2003). The variable products allowed the customers to select different investment portfolio in the policies. Thus, the need arising from the new products and customers would motivate the organizations to accept new systems facilitating the customers to make the preferable choices according their specific requests. The variables identified in the category of environment are summarized in Table 4-1.

Table 4-1 Variables of Environments

Variable	Root	Reference
Industrial competition	Industrial influences	(Belassi & Fadlalla 1998)
	Environment factors	(Grover 1993)
	Competition	(Holsapple & Joshi 2000)
	Competitiveness	(Chen, Shih-Wen 2003)
External environmental changes	Fashion and time	(Holsapple & Joshi 2000)
	External environmental changes	(Hung, Hui-Shu 2003)
Rules and regulations	Governmental and political climate	(Holsapple & Joshi 2000)
	Regulation and pressure from government	(Chien 2003)
Customer demand	Customer demand/taste	(Grover 1993)
	Customers' demand	(Hung, Hui-Shu 2003)
	Product and customer need	(Chen, Shih-Wen 2003)

4.3.1.2 Individual Characteristics

Ajzen and Fishbein (1980) indicated that the demographic variables, such as socioeconomic status, education and personality trait could be the external variables of behaviors. Individual factors, such as educational level, tenure and participation,

were the cluster in predicting innovation adoption in organizations (Kimberly & Evansiko 1981). To successfully introduce technological innovations into organizations, individual differences factors, including job tenure, cosmopolitanism, education and role involvement, were identified as the main forces (Kwon & Zmud 1987). In the study of customer relationship management system in Taiwan life insurance sector, Lo (2003) verified that individual background variables, e.g., age, education, position and tenure influenced significantly on the user's satisfaction and performance of the system. Innovativeness of an individual would allow him or her to have a higher level degree of mass media exposure and cope with higher levels of uncertainty about an innovation. As the first to adopt a new idea in the system, the innovators would not depend upon the subjective evaluations of the innovation from other members of their system (Rogers 1995). Chang's (2002) empirical study showed that personality had effect on employees' satisfaction on knowledge management. Liu (2004) examined the diffusion of an electronic system by testing Technology Acceptance Model and found that prior computer experience had effects on the employee's perceived ease of use and perceived usefulness. Table 4-2 presents the variables identified in the individual characteristics.

Table 4-2 Variables of Individual Characteristics

Variable	Root	Reference
Education	Education	(Ajzen & Fishbein 1980)
		(Lo 2003)
Position	Position	(Lo 2003)
Computer skill/experience	Computer skill	(Lo 2003)
	Computer experience	(Liu 2004)
Individual innovativeness	Innovativeness	(Rogers 1995)
Personality	Personality trait	(Ajzen & Fishbein 1980)
	Personality	(Chang 2002)

4.3.1.3 Information Technology

Alavi and Leidner (1999) found that managers' ascription to the concept of knowledge management merged to two perspectives related to information technology. On one hand, managers reported thinking about knowledge management to be about the characteristics of information, such as readily-accessible information, real-time information, actionable information, and reducing the overload of information by "filtering the gems" from the rocks". On the other hand, knowledge management was recognized as associated with various systems, including data mining, data warehouses, executive information systems, intranet, and various tools, such as search engines, multi-media and decision making tools. It was indicated (Alavi & Leidner 1999) that managers desired wider bandwidth, global information technology infrastructure, integrated databases, interoperability of existing systems, and fast retrieval to be the technology capabilities for knowledge management in their organizations.

Technology was also identified as one of the main infrastructure capabilities in knowledge management for an organization (Gold, Malhotra & Segars 2001). Through the linkage of information and communication systems in an organization, technology can effectively integrate the previously fragmented flows of information and knowledge. These linkages can eliminate barriers to communication that naturally occur between different parts of the organization. However, to have knowledge management in an organization, the managers would request to avoid overloading users with unnecessary data, eliminate the "old/wrong" data or knowledge that was no longer valid, keep the information current and keep up with new technologies. Meanwhile, customer confidentiality and the security of data on the internet were some of the managers' concerns in knowledge management (Alavi & Leidner 1999).

Based on Rogers's (1995) theory of Innovation Diffusion, Thong (1999) proposed that innovation characteristics of information systems, namely complexity, compatibility and relative advantages are the importance determinants for an organization in making the decision to adopt information systems or not. On the other hand, Agarwal and Prasad (1997) suggested that visibility, compatibility and

trialability of the innovation characteristics were the significant forces of initial use of a system, while relative advantage and result demonstrability are relevant in predicting the intended continuous use of the system.

In investigating the acceptance of Learning Management System (LMS) in a life insurance company in Taiwan, Chiu (2004) suggested that the information system background of the training staff, the functional characteristics of the system affected the users' perceived usefulness and perceived ease of use regarding the system. Liu (2004) also verified that technology characteristics had positive effect on the task-technology fit, and task-technology fit had positive influences on users' perceived usefulness and perceived ease of use toward the information system. Information technology and system characteristics played important roles (Lo 2003) in implementing the Customer Relationship Management (CRM) system in life insurance companies. The variables signified in information technology are summarized in Table 4-3.

Table 4-3 Variables of Information Technology

Variable	Root	Reference
Technology infrastructure	Technology perspective on knowledge management and technology-based knowledge management capabilities	(Alavi & Leidner 1999)
	Technology infrastructure capabilities	(Gold, Malhotra & Segars 2001)
	Technology characteristics	(Liu 2004)
System characteristics	System characteristics	(Lo 2003)
Correct and integrated database	Integrated database and elimination of wrong/old data	(Alavi & Leidner 1999)
Compatibility	Compatibility	(Rogers 1995)
	Compatibility	(Thong 1999)

	Compatibility	(Agarwal & Prasad 1997)
Function	Integration of cross-functional systems	(Alavi & Leidner 1999)
	Functional characteristics	(Chiu 2004)
Adaptation to changes	Keeping the information current and keeping up with the new technologies	(Alavi & Leidner 1999)
Trialability	Trialability	(Rogers 1995)
	Trialability	(Agarwal & Prasad 1997)
Security of data on internet and information protection	Security of data on internet and customer confidentiality	(Alavi & Leidner 1999)

4.3.1.4 Knowledge Management Characteristics

In the high-level principles to manage knowledge effectively on a daily basis, Davenport (1996) pointed out that "knowledge management requires knowledge managers". The tasks of knowledge managers would be collecting and categorizing knowledge, establishing a knowledge-oriented technology infrastructure, and monitoring the use of knowledge. Several professional service firms, such as Mckinsey, Andersen Consulting, Ernst & Young, and A.T. Kearney, had "Chief Knowledge Officers" (CKO) as the knowledge managers in place (Davenport 1996). Since managing knowledge was multidimensional process, the roles of Knowledge Advocate and Knowledge Steward were designed to focus people's attention on performing the knowledge manage processes (Chait 1999). The Knowledge Advocate was the champion for knowledge management and the Knowledge Steward (there could be more than one) had the operational responsibility for knowledge management within a practice. Besides, knowledge coordinators were put into place to coach, coax, cajole, and coerce Knowledge Stewards and practice leadership groups to make continued progress toward the objectives (Chait 1999).

Alavi and Leidner (2001) stated that knowledge transfer channels were the focal element in transferring knowledge. According to Holtham and Courtney (1998),

knowledge transfer channels can be informal (e.g., unscheduled meetings and coffee break conversations) or formal (e.g., training sessions and plant tours), personal (e.g., apprenticeships or personnel transfers) or impersonal (e.g., knowledge repositories). Informal transfer channels may be effective in promoting socialization but may preclude wide dissemination, and thus such mechanisms may be more effective in small organizations (Fahey & Prusak 1998; Holtham & Courtney 1998). On the contrary, formal transfer mechanisms may ensure greater distribution of knowledge but may inhibit creativity. Personal channels may be more effective for distributing highly context specific knowledge whereas impersonal channels may be most effective for knowledge that can be readily generalized to other context. Moreover, the most effective transfer channel depends upon the type of knowledge being transferred (Inkpen & Dikur 1998).

Three primary mechanisms were advocated by Grant (1996) to be essential for the integration of knowledge to create organizational capability and they included: directives, organizational routines, and self-contained task teams. Grant (1996) referred directives to the specific set of rules, standards and procedures. Organizational routines were referred to the development of task performance and coordination patterns, interaction protocols, as well as process specifications. The teams of individuals with prerequisite knowledge and specialty were formed for solving problems in situations of task uncertainty and complexity (Grant 1996). Furthermore, organizational design, in particular the building of communities of practice and shared knowledge creation spaces, was considered as a critical catalyst for knowledge creation (Alavi & Leidner 2001).

Successful knowledge management programs required motivational schemes and some arm-twisting from senior executives (Davenport & Glaser 2002). To guarantee conditions for innovation, namely knowledge management, were in place and sustained overtime required a strong support from top management (Brand 1998). Total resources could be a dimension that leads to innovations in an organization and observability was one of the innovation characteristics that would affect the diffusion of innovation (Rogers 1995).

Barney (1997) pointed that organizational components of a firm, such as its compensation policies, were the complementary resources and capabilities that could be combined with other resources and capabilities and enable a firm to fully realize its potential for competitive advantages. Sharing and use of knowledge should be highly motivated since the natural tendency of people was to hoard their knowledge and look suspiciously upon that from others (Davenport 1996). Therefore, there were some firms that began to evaluate and reward personnel for knowledge sharing and use (Davenport 1996).

Liou (2004), in a knowledge diffusion study in Taiwan, posited that participation had influences on knowledge sharing. It was also suggested by Hung, Mao-Sheng (2003) that personnel participation should be taken into consideration in applying knowledge management strategies in organizations. Yang (2004) found in the case studies of knowledge management practice in two life insurance companies that the companies emphasized more on the development of information system, while in lack of establishing the evaluation standards and specific divisions for knowledge management. The variables identified in knowledge management characteristics are presented in Table 4-4.

Table 4-4 Variables of Knowledge Management Characteristics

Variable	Root	Reference
KM managers	Chief Knowledge officer	(Davenport 1996)
	Knowledge coordinator	(Chait 1999)
KM team	Self-contained task team	(Alavi & Leidner 2001)
Top management support	Top management support	(Brand 1998)
	Motivation from senior executives	(Davenport & Glaser 2002)
Resources	Total resources	(Rogers 1995)
Guidelines and directions	Directives and guidelines	(Alavi & Leidner 2001)
	Guiding principles that cover knowledge implementation and	(Chait 1999)

	ongoing operation	
Participation	Participation	(Liou 2004)
	Personnel participation	(Hung, Mao-Sheng 2003)
Support of time and space	Shared knowledge creation spaces	(Alavi & Leidner 2001)
	Time to apply knowledge	
Knowledge Transfer channel	Knowledge transfer channel	(Alavi & Leidner 2001)
	Knowledge diffusion channel	(Wang, Chia-Hung 2002)
Knowledge type	Knowledge type	(Alavi & Leidner 2001)
		(Wang, Chia-Hung 2002)
Compensation policies and reward systems	Compensation policies	(Barney 1997)
	Rewarding personnel for knowledge sharing and use	(Davenport 1996)
Performance evaluation	Observability	(Rogers 1995)
	Evaluation system	(Alavi & Leidner 1999)

4.3.1.5 Organizational Characteristics

The adoption and practice of knowledge management in a life insurance enterprise involve not only the individual innovativeness, but also the organizational innovativeness. Rogers (1995) suggests that organizational characteristics, such as size and structure, will influence the innovativeness of an organization. Larger organizations are more innovative, just as are individuals with larger incomes and higher socioeconomic status. Besides, organizational structural characteristics like system openness and formalization were found to be related positively and negatively, respectively, to organizational innovativeness. Generally, a predictable organizational structure can be obtained through the following features: (i) predetermined goals; (ii) prescribed roles; (iii) authority structure; (iv) organizational rules and regulations; and (v) informal patterns (Rogers 1995).

Managing knowledge was no different from managing other aspects of an

organization in many ways (Chait 1999). Firstly, there must be a vision that linked with the objectives and strategies of organization. Secondly, people must be aligned with the vision. Thirdly, the alignment must be from the top down and all across the organization. Organizational structure was important in leveraging technological architecture (Gold, Malhotra & Segars 2001). It was crucial that the organizational structures were designed for flexibility so that they encouraged sharing and collaborating knowledge across boundaries with in organization (Gold, Malhotra & Segars 2001).

Though new technologies could be the more efficient means of knowledge creation and transfer, in the absence of an explicit strategy to better create and integrate knowledge in the organization, systems which facilitate communication and knowledge sharing had only a random effect at best (Alavi & Leidner 1999). Besides, knowledge management was linked by Alavi & Leidner (1999) to organizational learning, which could be viewed broadly as the process o internalizing and converting information to knowledge.

From a national survey among the life insurance companies in Taiwan, Yeh (2003) showed that the key factor of electronic learning execution in the life insurance industry was the size of enterprise and knowledge management was one of the major approaches to promote E-learning in the life insurance industry. Lu (2002) suggested that organizational learning played an important role in the knowledge management factors affecting the customer relationship management in the life insurance industry. Yang (2004) reported that the companies in the life insurance industry in Taiwan applied information technology widely to enhance their competitive competencies, while the consensus regarding knowledge management had not been achieved in their organizational objectives. In the long run, innovative strategies should be adopted in Taiwan life insurance industry to create the business value of knowledge innovation. Table 4-5 present the variables referred to the organizational characteristics in the tentative research model.

Table 4-5 Variables of Organizational Characteristics

Variable	Root	Reference
Size	Size	(Rogers 1995)
	Organization's size	(Alavi & Leidner 1999)
	Enterprise's size	(Yeh 2003)
Structure	Structural KM Infrastructure	(Gold, Malhotra & Segars 2001)
	Organizational structure	(Rogers 1995)
	Formal and informal planning, controlling, and coordinating systems	(Barney 1997)
Vision, value and objective	Predetermined goals	(Rogers 1995)
	Vision and alignment	(Chait 1999)
	Organizational objective/ Consensus	(Yang 2004)
Strategy	Explicit strategy to better create and integrate knowledge in the organization	(Alavi & Leidner 1999)
	strategy	(Yang 2004)
Organizational learning	Organizational learning system	(Alavi & Leidner 1999)
	Organizational learning	(Lu 2002)

4.3.1.6 Cultural Factor

In innovation diffusions, norms, i.e., the established behavior patterns for the members of a social system, could be a barrier to change (Rogers 1995). There were examples showing that people's behaviors were influenced by their cultural or religious norms. A firm's culture was categorized (Barney 1997) as one of the socially complex resources and capabilities, which were costly for other firms to

imitate or hard for other companies to engage in a systematic effort to create. However, "non-valuable" socially complex resources and capabilities could create sustained competitive "disadvantages" for a firm. Organizational cultures, values and management traditions could prevent the organizations from adopting new technologies in a timely and efficient manner (Barney 1997).

Chait (1999) emphasized that cultural realities could act as barriers or enablers for knowledge management. The cultural realities should be identified and taken into account in managing knowledge. The linkage of knowledge management directly to the culture and values of organizations was critical. A knowledge-friendly organizational culture was proposed as one of the most important conditions leading to the success of knowledge management initiatives in organizations (Davenport & Prusak 1998). Gold, Malhotra and Segars (2001) pointed out that organizational culture could be the most significant hurdle to effective knowledge management. Alavi and Leidner (2001) stated that culture has been identified by descriptive studies as a major catalyst, or alternatively a major hindrance, to knowledge creation and sharing.

According to Davenport and Prusak (1998), knowledge management projects should have the aim to develop a knowledge-intensive culture by encouraging and aggregating behaviors such as knowledge sharing (as opposed to hoarding) and proactively seeking and offering knowledge. Alavi and Leidner (1999) reported that the culture of teamwork and knowledge sharing was one of the knowledge management capabilities needed in organizations. Brand (1998) observed that innovation happened and knowledge management worked best when employees trusted that their company would be loyal to them over time. Gold, Malhotra and Segars (2001) demonstrated that the dialogue between individuals or groups were often the basis for creating new ideas. Employee interaction should be encouraged, both formally and informally, so that relationships, contacts, and perspectives could be shared by those not working side by side (O'Dell & Grayson 1998).

In probing into the knowledge management mechanism in the manufacturing industry in Taiwan, the findings of Chen, Shang-Shing (2003) showed that

support-oriented culture and regulation-oriented culture held great influences over knowledge creation, knowledge diffusion and knowledge accumulation. Hung, Hui-Shu (2003) suggested that the culture which was innovative, fair-emphasized, trust and human relationship oriented, could be the forces of an organization to perform the knowledge management strategy more effectively. Liou (2004) also found that the relationships with trust and commitment had impacts on employs in conducting the activities related to knowledge sharing. The variables identified in the cultural factors are presented in Table 4-6.

Table 4-6 Variables of Cultural Factor

Variable	Root	Reference
Knowledge-intensive culture	Knowledge-intensive culture	(Alavi & Leidner 2001)
Team-work/collective culture	team work culture	(Alavi & Leidner 1999)
Trust and commitment	Long-term commitment	(Brand 1998)
	Trust Fair-emphasis	(Hung, Hui-Shu 2003)
	Trust commitment	(Liou 2004)
Encouragement of exploration	Employees are encouraged to explore and experiment.	(Gold, Malhotra & Segars 2001)
Encouragement of asking for help	Employees are encouraged to ask others for assistance when needed.	(Gold, Malhotra & Segars 2001)
Encouragement of interaction with others	Employees are encouraged to interact with other groups.	(Gold, Malhotra & Segars 2001)

4.3.2 Perceptive Factors

Based on the Theory of Reasoned Action (Ajzen & Fishbein 1980) in social

psychology, its extension in information technology, Technology Acceptance Model (Davis 1986), and the theory of Innovation Diffusion (Rogers 1995), the tentative model propose that the perceptive factors of knowledge management consist of perceived usefulness (Compeau & Higgins 1995; Compeau, Higgins & Huff 1999; Davis 1986, 1989, 1993; Davis, Bagozzi & Warshaw 1989, 1992; Moore & Benbasat 1991; Rogers 1995; Thompson, Higgins & Howell 1991; Venkatesh & Davis 2000; Venkatesh & Morris 2000; Venkatesh et al. 2003), complexity (Davis 1986, 1989, 1993; Davis, Bagozzi & Warshaw 1989, 1992; Moore & Benbasat 1991; Rogers 1995; Thompson, Higgins & Howell 1991; Venkatesh & Davis 2000; Venkatesh & Morris 2000; Venkatesh et al. 2003), and subjective norm (Ajzen 1991; Ajzen & Fishbein 1980; Davis, Bagozzi & Warshaw 1989; Fishbein & Ajzen 1975; Mathieson 1991; Taylor and Todd 1995a, 1995b; Venkatesh & Davis 2000; Venkatesh & Morris 2000; Venkatesh, Morris & Ackerman 2000; Venkatesh et al. 2003).

Perceptions have been identified (Agarwal & Prasad 1998) as key independent variables in innovation models despite the existence of several modes and some divergences in hypothesized relationships. Yang (2004) argued that the practical operation of knowledge management in Taiwan life insurance industry had stressed more on the development of information technology, but the life insurance industry in Taiwan should trace backward to the human perceptions in integrating information technology and the organizational characteristics, and thus develop a practical mold of knowledge management which could truly create the commercial value for the organizations.

Perceived usefulness and perceived ease of use have drawn much attention in the literature of information technology. Perceived characteristics of innovation, including relative advantages, compatibility, complexity, trialability and observability have been identified important forces in diffusion of innovations.

Therefore, the tentative research model proposes that perceived usefulness, complexity, and subjective norm as the perceptive factors that will have impacts on the adoption and practice of knowledge management as illustrated as follows:

4.3.2.1 Perceived Usefulness

Ajzen and Fishbein (1980) in the TRA proposed that a person's beliefs that the behavior leads to certain outcome and his or her evaluation of the outcome would influence his or her attitude toward the behavior. Extended from TRA, Davis, Bagozzi and Warshaw (1989) in TAM defined perceived usefulness as "the degree to which a person believes that using a particular system would enhance his or her job performance." This definition followed the meaning of usefulness, i.e., "capability of being used advantageously". Applying motivation theories into TAM and viewing perceive usefulness as an example of extrinsic motivation, Davis, Bagozzi and Warshaw (1992) referred extrinsic motivation to the performance of an activity because it was perceived to be instrumental in achieving valued outcomes that are distinct from the activity itself, such as improved job performance, pay, or promotions. Davis, Bagozzi and Warshaw (1989) indicated that perceived usefulness was a major determinant of people's intention to use computer. Gefen and Straub (2000) reported that perceived usefulness played an essential role in the intended use and self-reported usage by stating that people's intentions to use computers in an organization were based mainly on a cognitive appraisal of how the systems will help them achieve enhanced performance.

Moore and Benbasat (1991) identified relative advantage as "the degree to which using an innovation is perceived as being better than using its precursor". Moreover, Rogers (1995) suggested that the characteristics of innovations, including relative advantages, compatibility, complexity, trialability and observability, as perceived by individuals, helped to explain their different rate of adoption. Not limited to information technology, Rogers (1995) identified innovation as "an idea, practice, or object that is perceived as new by an individual or another unit of adoption. The innovation in this research is "knowledge management". According to Rogers (1995), people would tend to adopt knowledge management when they perceived that knowledge management was better than it superseded.

According to Davis (1989), as well as Davis, Bagozzi and Warshaw (1989), the dimensions of perceived usefulness can be as follows: using a system would (i) enable an individual to accomplish tasks more quickly; (ii) improve his or her job

performance; (iii) increase his or her productivity; (iv) enhance his or her effectiveness on the job; (v) make it easier to do his or her job; and (vi) let the individual find the system useful in his or her job. Extended from previous studies, Davis (1993) measured perceived usefulness by asking the following ten questions: "(i) using X (electronic mail) improves the quality of the work I do; (2) using X gives me greater control over my work; (iii) X enables me to accomplish; (iv) X supports critical aspects of my job; (v) using X increases my productivity; (vi) using X improves my job performance; (vii) using X allows me to accomplish more work than would otherwise be possible; (viii) using X enhances my effectiveness on the job; (ix) using electronic mail makes it easier to do my job; and (x) overall, I find the X system useful in my job."

Venkatesh et al. (2003) reported that outcome expectations, consisting of performance expectations (job-related) and personal expectations (individual goals), were related to the consequences of the behavior. The items measuring the outcome expectations were: "If I use the system…(i) I will increase my effectiveness of the job; (ii) I will spend less time on routine job tasks; (iii) I will increase the quality of output of my job; (iv) I will increase the quantity of output for the same amount of effort; (v) My coworkers will perceive me as competent; (vi) I will increase my chances of obtaining a promotion; and (vii) I will increase my chances of getting a raise (Compeau & Higgins 1995; Compeau, Higgins & Huff 1999; Venkatesh et al. 2003). Based on the measurement items used in the past several studies, the variables of perceived usefulness are summarized in Table 4-7.

Table 4-7 Variables of Perceived Usefulness

Variable	Root	Reference
Work quality	Improve the quality of the work	(Davis 1993) (Moore & Benbasat 1991)
	Increase the quality of output on my job	(Thompson, Higgins & Howell 1991)
	Increase the quality of output of my job	(Compeau & Higgins 1995) (Compeau, Higgins & Huff 1999)

Productivity	Increase productivity	(Davis 1989, 1993) (Davis, Bagozzi & Warshaw 1989, 1992) (Moore & Benbasat 1991) (Venkatesh et al.2003)
Work quantity	Allow to accomplish more work than would otherwise be possible	(Davis 1993)
	Increase the quantity of out for the same amount of effort	(Thompson, Higgins & Howell 1991)
	Increase the quantity of out for the same amount of effort	(Compeau & Higgins 1995) (Compeau, Higgins & Huff 1999)
Time Reduction	Accomplish tasks more quickly	(Davis 1989) (Davis, Bagozzi & Warshaw 1989) (Moore & Benbasat 1991) (Venkatesh et al. 2003)
	Decrease the time needed for important job responsibilities	(Thompson, Higgins & Howell 1991)
	Spend less time on routine job tasks	(Compeau & Higgins 1995; Compeau, Higgins & Huff 1999)
Easier to do the job	Make it easier to do the job	(Davis 1989, 1993) (Davis, Bagozzi & Warshaw 1989) (Moore & Benbasat 1991)
Usefulness	Find X useful in my job	(Davis 1989) (Venkatesh et al. 2003)
	Overall, find X useful in my job	(Davis 1993)

Effectiveness	Enhance effectiveness on the job	(Davis 1989, 1993) (Davis, Bagozzi & Warshaw 1989; 1992)
	Increase my effectiveness on the job	(Moore & Benbasat 1991)
	Increase the effectiveness of performing job tasks	(Thompson, Higgins & Howell 1991)
	Increase my effectiveness of the job	(Compeau & Higgins 1995) (Compeau, Higgins & Huff 1999)
Perceived competency	My coworker will perceive me as competent	(Compeau & Higgins 1995) (Compeau, Higgins & Huff 1999)
Promotion/Raise	Increase the chances of obtaining a promotion or getting a raise	(Compeau & Higgins 1995) (Compeau, Higgins & Huff 1999) (Venkatesh et al. 2003)

Perceived usefulness has been proposed in TAM to have direct impacts on actual usage of information technology. Both the TRA and the Innovation Diffusion theory identify such linkages by using similar variables, such as the beliefs that the behavior leads to certain outcome and relative advantage respectively. Therefore, the tentative research model proposes that perceived usefulness has the direct influence on knowledge management adoption and practice of.

4.3.2.2 Complexity

Complexity was defined by Rogers (1995) as "the degree to which an innovation is perceived as difficult to understand and use". The innovation was referred to knowledge management in this research.

Complexity is one of innovation characteristics that play important roles in the adoption and diffusion of innovations (Rogers 1995). Some innovations are readily understood by most members of a social system, while others are more complicated

and will be adopted more slowly. According to Rogers (1995), new ideas, such as knowledge management, that are simpler to understand are adopted more rapidly than innovations that require the adopter to develop new skills and understandings.

Complexity was also used by Thompson, Higgins and Howell (1991) to identify the degree to which a system was perceived as relatively difficult to understand and use. The opposite of the concept of complexity can be referred to the perceived ease of use widely used in TAM studies. Perceived ease of use was defined as "the degree to which a person believes that using a particular system would be free of effort" (Davis 1986, 1989, 1993; Davis, Bagozzi & Warshaw 1989, 1992). Moore and Benbasat (1991) addressed that the concept of complexity in theory of Innovation Diffusion and perceived ease of use in Technology Acceptance Model resembled each other in referring to the perceptions regarding how difficult or easy an innovation was to understand, learn and use.

Considering that complexity is an essential determinant in innovation adoption and diffusion, and perceived ease of use has been shown to have direct affects on the actual use, this research model proposes that complexity has direct influences on the attitude toward knowledge management adoption. Complexity in the theory of Innovation Diffusion is adopted in this study and considered more appropriate for explaining the complicatedness involved in knowledge management. The rationale is that perceived ease of use is more related to use of information system, while knowledge management comprises not only using information system, but also employing new ideas and practices.

The research model also suggests that complexity has its influence on perceived usefulness. Even though information technology is not the whole part of knowledge management, it does play an important role in having knowledge management into place in organizations. Numerous TAM studies (Davis 1989; Davis, Bagozzi & Warshaw 1989, 1992; Igbaria, Guimaraes & Davis 1995; Igbaria et al. 1997; Szajna 1996; Venkatesh & Davis 2000) showed that perceived ease of use affected perceived usefulness by describing that, a system which was easier to use was more useful for users. In the context of this research, the proposition would be

that, knowledge management which is difficult to understand and use is less useful for the adopters.

To measure the construct of complexity, Thompson, Higgins and Howell (1991) used the following items: (i) using the system takes too much time from my normal duties; (ii) working with the system is so complicated; it is difficult to understand what is going on; (iii) using the system involves too much time doing mechanical operations (e.g., data input); and (4) it takes too long to learn how to use the system to make it worth the effort. On the other hand, the reverse questions were adopted by Davis (1993) to measure perceived ease of use, including: "(i) I find X system cumbersome to use; (ii) interacting with X system is often frustrating; (iii) the X system is rigid and inflexible to interact with; (iv) interacting with the X system requires a lot of mental effort; and (v) I find it takes a lot of effort to become skilful at using X, comply with the concept of complexity." Therefore, the variables reflecting the construct of complexity in this research model are presented in Table 4-8.

Table 4-8 Variables of Complexity

Variable	Root	Reference
Difficult to use	An innovation is perceived as difficult to understand and use	(Rogers 1995)
	Working with the system is so complicated; it is difficult to understand what is going on.	(Thompson, Higgins & Howell 1991)
	Find X (the system) cumbersome to use	(Davis 1993)
Taking too much time	Using the system takes too much time from my normal duties.	(Thompson, Higgins & Howell 1991)
	Using the system involves too much time	(Thompson, Higgins & Howell 1991)

	doing the mechanical operations (e.g., data input)	
	It takes too long to learn how to use the system to make it worth the effort.	(Thompson, Higgins & Howell 1991)
Frustrating, inflexible and tiring in interaction	Interacting with X system is often frustrating.	(Davis 1993)
	Interacting with the X system requires a lot of mental effort.	(Davis 1993)
Taking efforts to become skillful	Find it takes a lot of effort to become skillful at using X.	(Davis 1993)

4.3.2.3 Subjective Norm

Subjective norm was defined as "the person's beliefs that specific individuals or groups think he should or should not perform the behavior" (Ajzen & Fishbein 1980). Subjective norm referred to the person's perception of the social pressures put on him or her to perform or not perform the behavior. It was argued by Ajzen and Fishbein (1980) that a person who believed that most referents with whom the person was motivated to comply thought he or she should perform the behavior would perceive social pressure to do so. According to Ajzen and Fishbein (1980), subjective norm and the person's attitude toward the behavior, which referred to the person's judgment that performing the behavior was good or bad, determined a person' behavior intention. In this research, subjective norm helps describe the social influence that may affect a person's attitude toward knowledge management adoption and thus on the implementation of knowledge management.

In the theory of Innovation Diffusion, Rogers (1995) also identified that social

system was an element in the diffusion of innovations. A social system was a set of interrelated units that were engaged in joint problem solving to accomplish a common goal. The social system constitutes a boundary within which an innovation, namely knowledge management in this research, diffuses. The system norms, identified by Rogers (1995) as "the established behavior patterns for the members of a social system", told individuals what behavior they were expected to perform. In this study, the system basically refers to an organization in which the concept and applications of knowledge management is adopted and diffused. Therefore, the subjective norm in an organization is proposed to have impacts on people's adopting and applying knowledge management.

Rogers (1995) pointed that opinion leaders also exemplified and expressed the system's structure. Opinion leaders were able to influence other individuals' attitudes or overt behavior informally in a desired way with relative frequency. Such informal leadership was earned and maintained by the individual's technical competence, social accessibility, and conformity to the system's system, rather than a function of the individual's formal position or status in the system (Rogers 1995). When the social system was oriented to change, the opinion leaders were relatively innovative. However, when the system's norm was opposed to change, the opinion leaders' behaviors also reflected the norm. Consequently, opinion leaders, by their close conformity to the system norms, served as an apt model for the innovation behavior of their followers (Rogers 1995).

Davis (1989) called for further research to better understand the nature of social influences, as well as to investigate conditions and mechanisms governing the impact of social influences on usage behavior. The classic TAM studies (Davis 1986, 1989) did not include the TRA's subjective norm (SN) as a determinant of behavior intention (BI). There was a lack of significant SN-BI effects found in the comparison of TRA and TAM in examining user acceptance of computer technology (Davis, Bagozzi & Warshaw 1989). Davis, Bagozzi and Warshaw (1989) noted that sophisticated methods for assessing the specific types of social influence processes at work were clearly needed. Thompson, Higgins and Howell (1991) identified social factors as "the individual's internalization of the reference group's subjective culture,

and specific interpersonal agreements that the individual has mad with other, in specific social situations, and showed that social factors positively and significantly influenced the utilization of PCs among knowledge workers. Developing and testing an extension of TAM, Lucas and Spitler (1999) suggested that social norms and one's job requirement were more essential in predicting technology usage than perceived usefulness and perceived ease of use. One possible explanation for the different roles of subjective norms in TAM studies was that, Davis, Bagozzi and Warshaw's (1989) empirical studies were mostly conducted among students and the specific application, such as work processing, which was more personal and individual and may be driven less by social influences compared to more multi-person applications such as electronic mails and project management systems. On the other hand, the relationship between social norms and PC utilization was found in a large manufacturing company (Thompson, Higgins & Howell 1991), and the role of social norm was identified more important in an organizational setting (Dishaw & Strong 1999). Examining knowledge management at both individual and organizational levels, this study suggests that managers and colleagues would have impacts on employees in their adoption and utilization of knowledge management.

Regarding who or what establishes the subjective norm for the members of a social system, Ajzen and Fishbein (1980) developed a standard question as follows: "most people who are important to me think I should…" Based on the standard question above, the subsequent studies (Ajzen 1991; Davis, Bagozzi & Warshaw 1989; Fishbein & Ajzen 1975; Mathieson 1991; Taylor & Todd 1995a, 1995b; Venkatesh et al. 2003) used the question that, "people who influence my behavior think that I should …", to observe subjective norm. Examining the construct of subjective norm in an organizational scenario, Thompson, Higgins and Howell (1991) adopted the following items: "(i) I use the system because of the proportion of co-workers who use the system; (ii) the senior management of this business has been helpful in the use of the system; (iii) my supervisor is very supportive of the use of the system for my job; and (iv) in general, the organization has supported the use of the system." Moreover, refining the constructs in innovation characteristics, Moore and Benbasat (1991) identified "image" as "the degree to which use of an innovation is perceived

to enhance one's image or status in one's social system" and the associated questions were asked as follows: (i) people in my organization who use the system have more prestige than those who do no; (ii) people in my organization who use the system have a high profile; and (3) having the system is a status symbol in my organization. Therefore, the aspects of subjective norm are shown as Table 4-9.

Table 4- 9 Variables of Subjective Norm

Variable	Root	Reference
People who are important to me	Most people who are important to me think I should …	(Ajzen 1991) (Ajzen & Fishbein 1980) (Davis, Bagozzi & Warshaw 1989) (Fishbein & Ajzen 1975) (Mathieson 1991) (Taylor & Todd 1995a, 1995b) (Venkatesh et al. 2003)
Coworkers' usage	I use the system because of the proportion of coworkers who use the system.	(Thompson, Higgins & Howell 1991)
Supervisor	My supervisor is very supportive of the use of the system for my job.	(Thompson, Higgins & Howell 1991)
Senior management	The senior management of this business has been helpful in the use of the system.	(Thompson, Higgins & Howell 1991) (Venkatesh et al. 2003)
Opinion leader	Opinion leaders serve as an apt model for the	(Rogers 1995)

	innovation behavior of their followers.	
Organization	In general, the organization has supported the use of the system.	(Thompson, Higgins & Howell 1991) (Venkatesh et al. 2003)
Image	People in my organization who use the system have more prestige than those who do no.	(Moore & Benbasat 1991)
	People in my organization who use the system have a high profile.	
	Having the system is a status symbol in my organization.	

4.3.3 Attitude toward KM Adoption

"Attitude toward the behavior" was identified by Ajzen and Fishbein (1980) to be the personal factor that played an essential role in influencing a person's intention which was viewed to be good predictors of behavior. The personal factor was the individual's positive or negative evaluation of performing the behavior. A person's attitude referred to his or her judgment that performing the behavior was good or bad and that he or she was in favor of or against performing the behavior (Ajzen & Fishbein 1980).

The TAM framework of Davis, Bagozzi and Warshaw (1989) suggested that the potential user's attitude using an information system determined the system's actual use. Davis (1992) reported that, in addition to perceived usefulness, enjoyment had a significant effect on people's intentions to use computers in the workplace. Based

on motivation theories, Davis (1992) viewed perceived usefulness as the "extrinsic motivation" and enjoyment as the "intrinsic motivation" referring to the performance of an activity for no apparent reinforcement other than the process of performing the activity per se. Similarly, "affect toward use", i.e., the feelings of joy, elation, or pleasure associate by an individual with a particular act, was adopted by Thompson, Higgins and Howell (1991) in examining personal computing utilization.

The innovation-development process of Rogers (1995) identified that, after organizational recognition, research and development of knowledge management, the innovation, i.e., knowledge management in this context, would need the employees to adopt the concept and methods of knowledge management and then implement the related activities. Therefore, the "behavior" in this stage is proposed to refer to "knowledge management adoption" and the "attitude toward the behavior" refers to the "attitude toward knowledge management adoption" in this research.

Ajzen and Fishbein (1980) proposed the measurement format for attitude as follows: "my voting in the next presidential is: (i) harmful/beneficial; (ii) good/bad; (iii) rewarding/punishing; and (4) unpleasant/pleasant." Taylor and Todd (1995a, 1995b) tested the attitudinal factors by asking the following questions: (i) using the system is a bad/good idea; (ii) using the system is a foolish/wise idea; (iii) I dislike/like the idea of using the system; and (iv) using the system is unpleasant/pleasant. The measurements used by Davis, Bagozzi & Warshaw (1992) in investigating intrinsic motivation included: (i) I find using the system to be enjoyable; (2) the actual process of using the system is pleasant; and (iii) I have fun using the system. Thompson, Higgins and Howell (1991) asked about "affect toward use" by using the flowing items: (i) the system makes work more interesting; (ii) working with the system is fun; and (iii) the system is okay for some jobs, but not the kind of job I want. Moreover, Compeau and Higgins (1995), as well as Compeau, Higgins and Huff (1999) measured "affect" by the items as follows: (i) I like working with the system; (ii) I look forward those of my job that require me to use the system; (iii) using the system is frustrating for me; and (iv) once I start working on the system, I find it hard to stop. The "attitude toward technology usage" was examined by asking: "(i) using the system is a bad/good idea; (ii) the system makes work more

interesting; (iii) working with the system is fun; and (iv) I like working with the system (Venkatesh et al. 2003). Therefore, the variables for describing the attitude toward knowledge management adoption in this study are grouped in Table 4-10.

Table 4-10 Variables of Attitude toward KM Adoption

Variable	Root	Reference
A good idea	Adopting knowledge management is a good idea.	(Ajzen & Fishbein 1980) (Davis, Bagozzi & Warshaw 1989) (Taylor and Todd 1995a, 1995b) (Venkatesh et al. 2003)
Interesting	Adopting knowledge management makes work more interesting	(Thompson, Higgins & Howell 1991) (Venkatesh et al. 2003)
Fun	Knowledge management adoption is fun	(Davis, Bagozzi & Warshaw 1992) Thompson, Higgins & Howell 1991) (Venkatesh et al. 2003)
Likes	I like adopting knowledge management	(Ajzen & Fishbein 1980) (Davis, Bagozzi & Warshaw 1989) (Compeau & Higgins 1995) (Compeau, Higgins & Huff 1999) (Taylor & Todd 1995a, 1995b) (Venkatesh et al. 2003)

4.3.4 Knowledge Management Practice

Knowledge management processes, including acquisition, conversion, application, and protection, along with a knowledge infrastructure of technology, structure and culture, were identified as critical organizational capabilities that would positively and significantly influence the organizational effectiveness (Gold, Malhotra & Segars 2001).

Various aspects of knowledge management processes could be categorized (Gold, Malhotra & Segars 2001) into four main dimensions: knowledge acquisition, knowledge conversion, knowledge application and knowledge protection. Acquisition–oriented processes referred to those oriented toward obtaining knowledge, e.g., to acquire, seek, generate, created, capture, and collaborate knowledge (Dyer 1997; Inkpen 1996; Inkpen & Beamish 1997; Inkpen & Dikur 1998; Leonard 1995; Nonaka & Takeuchi 1995; Teece 1998). Conversion-based processes were those oriented toward making existing knowledge into useful form, such as the activities to organize, integrate, combine, structure, coordinate, or distribute knowledge (Davenport, Delong & Beers 1998; Davenport, Jarvenpaa & Beers 1996, Grant 1996; Davenport & Klahr 1998; Moore 1996; O'Dell & Grayson 1998). Application-oriented processes were those oriented toward the actual us of knowledge, including storage, retrieval, application and contribution of knowledge (Almeida 1996; Appleyard 1996; Skyrme & Amidon 1998; Spender 1996). Security-based processes were those designed to protect the knowledge from illegal use or theft, such as protecting knowledge via patents, trademarks and copyrights (Porter-Liebskind 1996).

Shin, Holden and Schmidt (2001) also integrated different terminologies used by previous researchers (Daal, Hass & Weggeman 1998; Demarest 1997; Holzner & Marx 1979; Liebowitz 1999b; Nonaka & Takeuchi 1995; Pentland 1995) in describing knowledge management processes and proposed a knowledge management value chain, which consisted of four major activities: knowledge creation, knowledge storage, knowledge distribution and knowledge application. Meanwhile, Holsapple and Singh (2001) identified a knowledge chain model which was composed of the primary activities (e.g., acquisition, selection, generation,

internalization and externalization) and the secondary activities (e.g., leadership, coordination, control and measurement.). It was suggested that organizations could focus on the knowledge management activities in the knowledge chain model to achieve their competitiveness (Holsapple & Singh 2001).

Gold, Malhotra and Segars (2001) investigated knowledge management processes in various dimensions, such as generating new knowledge from existing knowledge, filtering knowledge, organizing knowledge, integrating different sources and types of knowledge, distributing knowledge thorough the organization, as well as using knowledge to develop new products/services, solve new problems and improve efficiency. Hung (2004) explored the implementation of knowledge management among the small and medium-sized enterprises in Taiwan by using the following measurements: (i) the process of knowledge creation; (ii) the process of knowledge storage; (iii) the process of knowledge distribution; and (iv) the process of knowledge application.

To sum up, the variables identified as reflecting the practice of knowledge management are summarized in Table 4-11.

Table 4-11 Variables of Knowledge Management Practice

Variable	Root	Reference
Knowledge acquisition	To capture knowledge	(Chait 1999) (Delong 1997) (Gold, Malhotra & Segars 2001)
	To acquire knowledge	(Gold, Malhotra & Segars 2001) (Leonard 1995)
	To create knowledge	(Gold, Malhotra & Segars 2001) (Skyrme & Amidon 1998) (Teece 1998)
Knowledge identification	To evaluate and cleanse knowledge	(Chait 1999)

	Creation identify	(Shin, Holden & Schmidt 2001)
Knowledge integration	To organize, integrate, combine, structure, coordinate knowledge	(Gold, Malhotra & Segars 2001)
	To collaborate and integrate knowledge	(Leonard 1995) (Teece 1998)
Knowledge storage	Knowledge storage	(Chait 1999) (Shin, Holden & Schmidt 2001)
Knowledge distribution	Knowledge transfer	(Alavi & Leidner 2001) (Delong 1997) (Gold, Malhotra & Segars 2001) (Skyrme & Amidon 1998) (Spender 1996)
	Transformation, dissemination, transference and share	(Shin, Holden & Schmidt 2001)
Knowledge application	Use of knowledge	(Delong 1997) (Gold, Malhotra & Segars 2001) (Skyrme & Amidon 1998) (Spender 1996)
	Knowledge application	(Alavi & Leidner 2001)
	Implementation, application and use	(Shin, Holden & Schmidt 2001)
Routinizing	Routinizing: the innovation becomes an ongoing element in the organizational activities	(Rogers 1995)

4.3.5 Perceived Performance

Knowledge management has emerged in recent times as a phenomenon with a wide range of implications for organizational innovation and competitiveness. Supporters argued that as organizations understood the value of knowledge management, they hade the opportunity to establish long-term internal strengths (Chourides, Longbottom & Murphy 2003).

Skyrme and Amidon (1997) offered that, through successful knowledge management programs, an organization could achieve better performance in areas of competitive advantage, customer focus, improve employee relationship, innovation and lower costs. Zhao and Bryar (2001) suggested that knowledge management had impacts on total quality, particular in the aspects of continuous improvement and empowerment of the workforce.

While considerable research has been devoted to understand the mechanisms of knowledge management, few studies have been able to quantify the benefits in a manner that was consistent across firms (Feng, Chen & Liou 2004). By using financial performance indicators, Feng, Chen and Liou (2004) suggested that the impact of adopting knowledge management system on the reduction of production costs was insignificant as previous research (Bharadwaj 2000; Mitra & Chaya 1996; Poston & Grabski 2001). However, the main purposes of knowledge management system are to reduce administrative expenses and to improve productivity by maximizing knowledge management capacity. Feng, Chen & Liou (2004) argued that giving managers necessary access to the knowledge repository could allow them to efficiently review and effectively retrieve the timely information, and thereby provide essential knowledge for better decision makings.

Chou (2001) reported that knowledge management activities were not shown to have significant influences on organizational performance in the financial industry, and the reason by Chou (2001) was that, the value of knowledge management might not be revealed in the financial indicators, and the financial industry had just initiated to adopt or apply knowledge management for few years. Gold, Malhotra and Segars (2001) also indicated that capturing the impact of knowledge management on

organizational performance in terms of financial indicators, such as return on investment (ROI), return on equity (ROE) and so on, could be significantly affected by many uncontrollable macroeconomic factors.

There were various criterions for the evaluation of organizational performance and the indicators should be chosen according to the research theme (Wang 2004). Wang (2004) suggested that perceived organization performance could more signify the worth of knowledge management since the contributions of knowledge management activities on the organizational operational performance were hard to transform into the visible profits in financial performance indicators (Ahn & Chang 2004). Hence, perceived performance indicators were used by Wang (2004) to investigate the relationship between knowledge management and organizational performance among Taiwan commercial banks and the results showed that different types of knowledge management had impacts on the perceived performance of the banks (Wang 2004).

Li and Atuahene-Gima (2001) adopted perceived relative performance in examining the influence of product innovation on performance of new technology ventures by asking that, "relative to the principal competitors, rate the firm performance over the last three years on: return on investment, return on sales, profit growth, return on assets, overall efficiency of operations, sales growth, market share growth, cash flow from market operations and firm's overall reputation." Two perceptual measures were proposed to evaluate organizational performance (Delaney & Huselid 1996) by advising that the past research had found perceived organizational performance measured correlate positively (with moderate to strong associations) with objective measures of firm performance (Dollinger & Golden 1992; Powell 1992). The market performance variable focused more on economic outcomes, e.g., profitability and market share, by asking the respondents' perceptions of their firms' performance relative to product market competitor. The perceived organizational performance assessed the respondents' perceptions of their firms' performance, such as product quality, customer satisfaction and new product development, relative to that of similar organizations (Delaney & Huselid 1996). Maintaining that financial performance indicators would be affected by many other factors, such as economic

status and size of the organization, Liou (2004) identified that knowledge sharing had influences on operational performance satisfaction by asking the respondents' perceptions regarding their organizational performance in improving product design, product quality and customer satisfaction (Kotabe, Martin & Domoto 2003).

Alavi and Leidner (1999) reported that the perceived organizational benefits of knowledge management system could be shown in two primary dimensions: process improvement and organizational outcomes. The process results involved saving time, increasing staff participation, enhancing communication, reducing problem-solving time, better serving the clients and providing better measurement and accountability. Performance, such as cost reduction, increased sales, personnel reduction and higher profitability were identified as the organizational outcomes (Alavi & Leidner 1999). Gold, Malhotra and Segars (2001) advocated that the knowledge management process capability of an organization had impacts on the organizational effectiveness, such as innovating new products and services, adapting quickly to unexpected changes, being responsive to new market demands, as well as reducing redundancy of information and knowledge. Based on the preceding discussions, the variables identified to reflect the perceived performance of knowledge management for the organization are summarized in Table 4-12.

Table 4-12 Variables of Perceived Performance

Variable	Root	Reference
Profit growth	Profit growth	(Li & Atuahene-Gima 2001)
	Profitability	(Delaney & Huselid 1996)
	Higher profitability	(Alavi & Leidner 1999)
Sales growth	Sales growth	(Li & Atuahene-Gima 2001)
	Increased sales	(Alavi & Leidner 1999)
Market share growth	Market share growth	(Li & Atuahene-Gima

		2001)
	Market share	(Delaney & Huselid 1996)
Customer satisfaction	Customer satisfaction	(Delaney & Huselid 1996) (Liou 2004)
	Customer focus	(Alavi & Leidner 1999)
	Better service	(Alavi & Leidner 1999)
Product quality	Product quality	(Delaney & Huselid 1996) (Kotabe, Martin & Domoto 2003) (Liou 2004)
Overall operational efficiency	Overall efficiency of operations	(Li & Atuahene-Gima 2001)
	Process design	(Kotabe, Martin & Domoto 2003) (Liou 2004)
	Overall efficiency	(Alavi & Leidner 1999)
Cost down	Decreased cost	(Alavi & Leidner 1999)
	Personnel reduction	(Alavi & Leidner 1999)
Ability to innovate	New product development	(Delaney & Huselid 1996)
	Ability to innovate	(Gold, Malhotra & Segars 2001)
	Rapid commercialization of new products	
	Ability to unanticipated surprises	
	Responsiveness to	

	market change	

4.4 Definition of Terms

The terms used in the model are defined as follow:

Knowledge: The understanding, awareness, or familiarity acquired through study, investigation, observation, or experience over the course of time. It is an individual's interpretation of information based on personal experiences, skills and competencies (Bollinger & Smith 2001). For example in the case of life insurance industries, "knowledge" might constitute the familiarity and professional capability in underwriting, claim and customer service.

Knowledge Management: The process of identifying, managing and leveraging individual and collective knowledge to support the firm becoming more competitive (Carlsson 2001).

Perceived Usefulness: The degree to which a person believes that using a particular system would enhance his or her job performance (Davis, Bagozzi & Warshaw 1989).

Complexity: The degree to which an innovation is perceived as difficult to understand and use (Rogers 1995).

Subjective Norm: The beliefs that specific individuals or groups think he should or should not perform the behavior (Ajzen & Fishbein 1980).

Life Insurance Industry (in Taiwan): Companies which are certified to operate life insurance in Taiwan according to the *Insurance Law* (*Insurance Law* 2005).

4.5 Summary

Since adopting and applying knowledge management is a recent phenomenon in the life insurance business in Taiwan, the proven innovation theory can be used as the foundation of the adoption and diffusion processes of knowledge management

among Taiwan life insurance enterprises. Besides, the well-developed TRA and TAM models provide the bases in proposing the perceptive factors, such as perceived usefulness, complexity and subjective norm, as well as the attitude toward KM adoption as the factors affecting the applications of knowledge management. The external factors in this study were identified through comprehensive literature review and the specific variables empirically unearthed in Taiwan. The measurements for several constructs have been provided in the previous studies. Nevertheless, they need to be adapted to be used in the context of Taiwan life insurance industry. The factors identified from the knowledge management literature and Taiwan's practical research were also required to be further explored to recognize the appropriated dimensions. Therefore, this study utilized an exploratory field study, which was qualitative in nature, to fine-tune the research model before administering quantitative surveys. The next chapter will present discussions of the research methodology and the research design.

Chapter 5 RESEARCH METHODOLOGY AND DESIGN

5.1 Introduction

This study attempts to identify the factors of knowledge management adoption and practice in Taiwan life insurance industry, and investigate how the factors affect the performance of the organization via applying knowledge management. As described in Chapter 4, the models of the Theory of Reasoned Action (TRA) (Ajzen & Fishbein 1980), Technology Acceptance Model (TAM) (Davis 1986) and Innovation Diffusion (Rogers 1995) have been applied as the theoretical foundation for this research. The findings of previous knowledge management studies and unique features of the life insurance business in Taiwan were employed to extend the existing theories to develop the research model in this study. There is a necessity to adapt the research model and its associated factors to be usable in the context of Taiwan life insurance industry (Yang 2004). Hence, this study utilizes the mixed method research approach, in which a field study is conducted and followed by a pilot study and the main survey.

The research paradigm and research method of the mixed methodology approach are

discussed first in this chapter. The detailed descriptions of three stages, namely field study, pilot test and national main survey, are provided next. The sample selection, data collection and analysis techniques are presented for each stage. Finally, other research methodology issues involved in this study are also discussed.

5.2 Research Paradigm and Method

5.2.1 Research Paradigm

Research paradigm is the progress of scientific practice based on people's philosophies and assumptions about the world (Hussey & Hyssey 1997). A paradigm may be viewed as a set of basic beliefs that deal with ultimatums or first principles (Guba & Lincoln 1994). There are two major research paradigms: interpretivist and positivist (Crotty 1998). The interpretivist paradigm sees reality as dependent on the mind and thus the researcher has to plunge into the actor's mind by feeling, hearing and observing how the actor interprets what is occurring in the context of the particular act (Schwandt 1994). However, the positivist paradigm assumes that reality is apprehendable and therefore a scientific concept or research idea can be objectively measured and observed (Hessler 1992).

According to Creswell (2003), the interpretivist paradigm and the positivist paradigm can be further illustrated as shown in Table 5-1.

Table 5-1 Interpretivist Paradigm and Positivist Paradigm

Assumption	Interpretivist Paradigm	Positivist Paradigm
Ontological assumption: the nature or reality	Reality is subjective and multiple.	Reality is objective and singular.
Epistemological assumption: the relationship of the research to that issue being researched	The researcher interacts with and affects the issue being researched.	The researcher is independent from what is being researched.

Axiological assumption: the role of values	Scientific study is value laden and biased.	Science is value free and unbiased.
Rhetorical assumption: the language of research	Interpretivists consider the language for research is informal and prefer to use qualitative words that evolve decisions.	Positivists regard the language for research as formal and prefer to use quantitative words that are based on set definitions.
Methodological assumption: the process of research	Believing in idealism, the interpretivists use different research methods to obtain different perceptions of the phenomena.	Believing in realism, the positivists focus on objective facts and hypothesis formulation.

(Adapted from Creswell 2003)

However, in such a complex modern world, paradigms are viewed as social constructions and thereby as highly mutable and dynamic (Tashakkori & Teddlie 2003). There has been research attempting to bridge the two paradigms to manage relevant research (Goles & Hirschheim 1999; Mingles 2001). By interplay between paradigms, researchers can take advantage of cross-fertilization between paradigms by transposing contributions from studies in one paradigm into the theoretical frameworks of another (Goles & Hirschheim 1999). Mingles (2001) states that the research results are richer and more reliable if different research methods are combined because the world is multidimensional. The researchers have called for the combination of interpretive and positivist research methodologies (Gable 1994; Tashakkori & Teddlie 2003).

This study mainly takes the positivist standpoint. The reason is that relevant prior studies were mostly undertaken under the positivist paradigm and the constructs and factors in the current study can be observed and measured. However, the positivist study is supported by an embedded interpretivist study, a qualitative field study, which serves to strengthen the richness and reliability of the positivist study.

5.2.2 Research Method

The mixed method approach is accepted as the research method in this study. Mixed method research is defined as research studies which use qualitative and quantitative data collection and analysis techniques in either parallel or sequential phases (Tashakkori & Teddlie 2003). By using the mixed method, this study starts with developing a tentative model (see Figure 4-1) that is based on comprehensive literature review. It is then followed by an embedded qualitative field study, which is undertaken through interviews, to fine-tune the tentative model and develop the comprehensive research model. Research hypotheses and questionnaires are developed based on the comprehensive research model. Finally, quantitative empirical studies are conducted through the pilot test and the major survey to ultimately measure and test the proposed hypotheses.

This study adopts the mixed method approach based on the following arguments:

1. Mixed methods research can answer research questions that the other methodologies cannot (Tashakkori & Teddlie 2003). Most quantitative research is confirmatory and involves theory verification, while much qualitative research is exploratory and involves theory generation. Accordingly, a major advantage of mixed methods research is that it enables the researcher to simultaneously answer confirmatory and exploratory questions, and thus verifies and generates theory in the same study (Tashakkori & Teddlie 2003).

2. Mixed methods research provides better (stronger) inferences. Greene, Caracelli and Graham (1989) propose that mixed methods lead to multiple inferences that confirm or complement each other, and in mixed methods studies the inferences made at the end of one phase (e.g., qualitative study) lead to the questions and/or design of a second phase (e.g., quantitative study).

3. Mixed methods provide the opportunity for presenting a greater diversity of divergent view. Deacon, Bryman and Fenton (1998) state that the mixed methods, alerting the researcher to the possibility that the issues are more

multifaceted than they may have initially supposed, offer the opportunity to develop more convincing and robust explanations of the social processes being investigated.

To better answer the research questions, this study attempts to explore the particular factors affecting knowledge management in the life insurance industry in Taiwan and verify the theory generation as well. Therefore, a qualitative field study is designed to provide more specified factors and variables for the comprehensive research model before empirically testing the model in Taiwan.

5.3 Research Process

By using the mixed method, the research was carried out in the following steps (see Figure 5-1):

Step 1: Literature Review & Research Questions and Objectives

It was aimed in this step to identify potential key variables from prior research and to propose research questions and research objectives.

Step 2: Conceptual Framework and Tentative Research Model

The constructs obtained from the previous stage would be used to develop the tentative research model.

Step 3: Field Study & Content Analysis

In this step, ten interviews were conducted with key persons in the life insurance industry in Taiwan. The interview scripts were transcribed by the researcher and the contents were analyzed in two stages. Stage one dealt with single interview transcripts, while stage two dealt with cross interview transcripts to integrate all the individual factors, variables and their relationships to produce the combined model of knowledge management adoption and practice.

Step 4: Combined Research Model, Hypotheses and Questionnaire Design

The hypotheses of this study were proposed based on the combined research

model obtained from the previous step. A preliminary questionnaire was then developed based on the research hypotheses.

Step 5: Pilot study & Main Survey

The tentative questionnaire was firstly pilot tested with several managers and staff in the life insurance companies. The feedbacks from the pilot study were used to produce the final questionnaire. Then, a nation-wide survey was conducted among the life insurance companies that were certified to operate life insurance business in Taiwan according to the *Insurance Law*.

Step 6: Data Analysis & Finding Interpretation

The data from the national survey was analyzed to produce descriptive statistics, test construct validity/reliability and hypotheses/model, by using structural equation modeling approach (PLS). The findings were finally interpreted based on statistical test results and literature review.

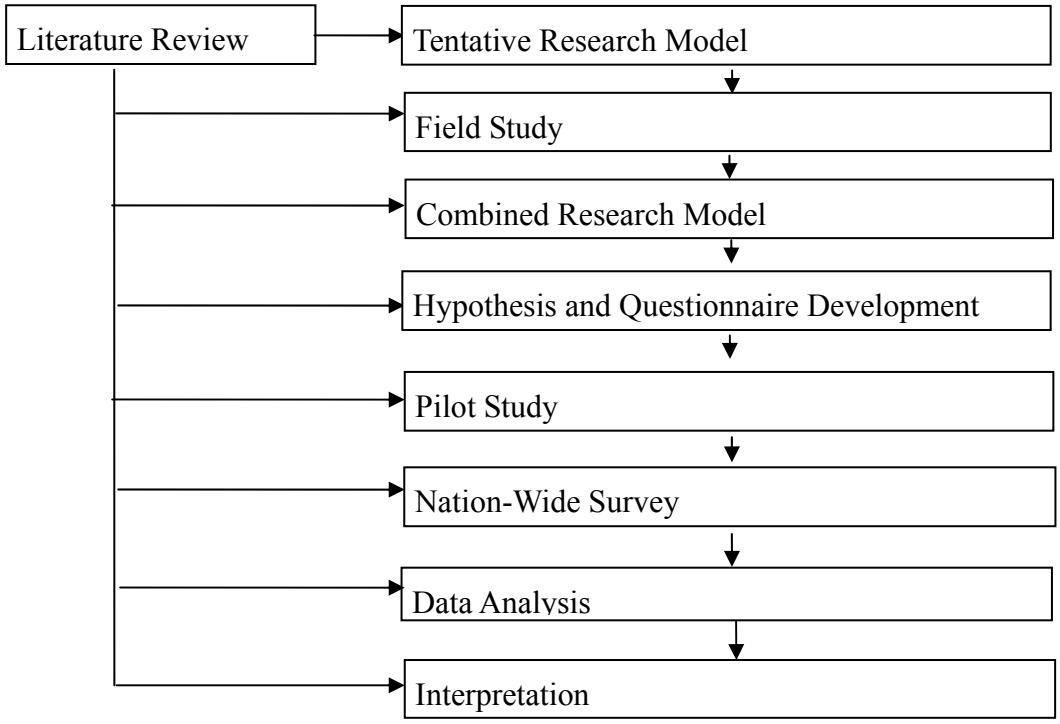

Figure 5-1 Research Process

5.3.1 Field Study

The field study in this research was undertaken via qualitative interviews, in which the interpretivist paradigm was adopted. According to Glock (1987), a major source of data in survey research was the qualitative interview conducted in the planning phases of the research. Such interviews, with a small but roughly representative sample of the population to be surveyed subsequently, provided an indispensable way to learn about the nature of variation and how to operationalize it (Glock 1987). The administration of the field study was detailed in next sections.

5.3.1.1 Sample Section

For qualitative field study this research took a convenience sampling procedure. This category of sample relied on available subjects who were close at hand or easily accessible (Berg 2004) and was adopted commonly in business research (Zikmund 2000). Ten key persons from life insurance industry who were willing to participate in this field study were selected. Main criteria for selecting the subjects were that they must be knowledge workers in their organizations and both staff and managers were approached. The key persons were contacted via phone to get their approval to participate in the interviews.

5.3.1.2 Data Collection

Semi-structured interviews were designed in this stage to collect data. Three major categories of interview structures have been identified by researchers (Babbie 2001; Merriam 2001; Nieswiadomy 2002): the standardized (formal or structured) interview, the unstandardized (informal or nondirective) interview, and the semistandardized (guided-semistructured or focused) interview. The characteristics of semi-structured interviews and their differences from the other two interview structures in terms of formality continuum can be illustrated in Figure 5-2.

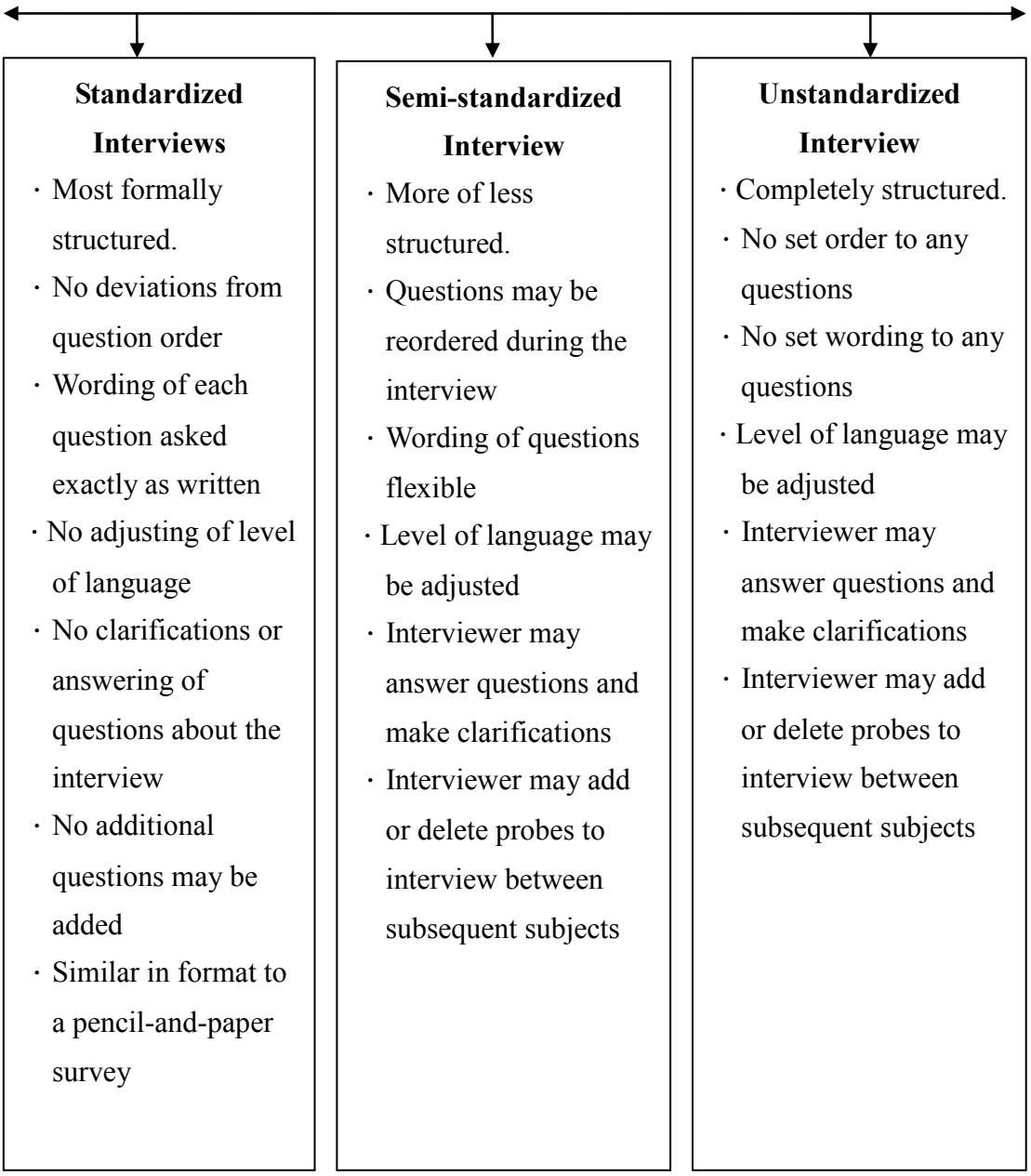

Figure 5-2 Characteristics of Different Interview Structures (Adapted from Berg 2004)

For the current study, semi-structured interviews was considered suitable for collecting relevant data to explore and refine the research model of knowledge management adoption and practice in Taiwan life insurance industry for later survey.

The guiding semi-structured questions were developed from comprehensive literature review. A pre-test field interview was conducted with a company. Minor

adjustments, namely that the interviewer would ask the questions by referring them to some specific KM related activities, were made based on the feedbacks acquired from the pre-test interview.

As mentioned earlier, a total of ten interviews were conducted in the field study. All interviewees were approached beforehand via phone addressing the research background and objective. An interview information sheet was then forwarded via email or faxed to them for better understanding this study. All interviews were audio-taped upon prior permissions of the interviews and transcribed immediately after the interviews.

5.3.1.3 Data Analysis

Interviews and field notes are often not amenable to analysis until the information they convey has been condensed (Miles & Huberman 1994). An objective coding scheme must be applied to interpret the interview transcripts and field notes. There are a number of procedures for data analysis in qualitative research (Miles & Huberman 1994). However, an appropriate analytic tool must be chosen based on the research objectives (Berg 2004).

Content analysis is selected as the data analysis approach in the field study for two main reasons. Firstly, the nature of the field study in this research is more exploratory than confirmatory. Secondly, content analysis is useful in analyzing interview data and is cost effective. Content analysis may be limited to examining already recorded messages, however such a limitation is minimal when it is undertaken as an analysis tool rather than as a complete research strategy (Berg 2004).

This research took the content analysis approach in two stages (Miles & Huberman 1994; Berg 2004). The first stage was the content analysis for single interview and its procedures were as follows:

1. Read through the interview transcripts and find the key themes/patterns.
2. Establish grounded categories for these key themes/phrases.
3. Revise the grounded categories to be the systematic categories by linking to the

literature, and determine the systematic criteria of selection.

4. Sort the interview transcripts into the systematic categories according to the systematic selection criteria and find their links.
5. Find the links among the factors and variables for the individual interview.
6. Provide the tables of systematic categories with the factors and variables from each interview.

The second stage was the content analysis across interview, which mainly dealt with integration of the factors and variables from each interview. The processes in the second stage included the following steps:

1. Review the table of systematic categories with factors and variables and their links obtained from the first stage.
2. Examine the differences and similarities of the variables in each factor.
3. Combine the similar variables and generate a common name, while retaining the unique variables.
4. Link the individual models for six companies based the integrated factors and variables.
5. Establish the combined table of integrated factors and variables in which the number of entries from six companies was shown.
6. Develop the comprehensive model of KM adoption and Practice.

5.3.2 Empirical Pilot Study

A quantitative pilot study via questionnaires was conducted to empirically verify the factors and variables of the combined research model. The feedbacks from the pilot study were taken to make some adjustments for the final survey questionnaires.

5.3.2.1 Questionnaire Development

A preliminary questionnaire was produced according to the hypotheses based on the comprehensive research model obtained from the previous step. Extensive literature review and discussions with three knowledge workers with several years of managerial experiences in Taiwan life insurance industry were involved in the phase of developing the questionnaire.

5.3.2.2 Sample Selection and Data Collection

The questionnaire was administered to the managers and staff in various departments of a life insurance company in Taiwan. The researcher contacted the managers via phone first and asked for their help to forward the questionnaires to other colleagues. After going over the questionnaires, the results obtained and the participants' opinions regarding the meaning and clarity of the questions and instructions were collected for revision of the final research questionnaire.

5.3.2.3 Data Analysis

Reliability tests were conducted to analyze the data obtained from the pilot survey. Since the pilot study was quantitative intrinsically, the internal consistency of the scale used in the questionnaire was considered the main issue in this phase. The Cronbach's guideline was employed, using SPSS software, in examining the reliability of the constructs. In addition, the layout and wordings of the preliminary questionnaire were further clarified and revised according to the results from the pilot study.

5.3.3 National Survey

A nation-wide survey was selected in this research to generate the results with sufficiently large sample size and provide a reasonable description of the practical situation from various aspects.

5.3.3.1 Sample Selection and Data Collection

The national main survey was conducted among the life insurance enterprises in Taiwan. The approach of cross-sectional research was utilized and eight life insurance companies, which varied in history, size and location, were selected to be the participant companies. The survey subjects were the office managers and staff who were involved in some sorts of knowledge work in various departments in the companies. The participant companies were approached via phone to get their approval and identify the contact persons. The survey questionnaires were then sent to the contact person to distribute the questionnaires to the target sample across departments and divisions.

The contact persons were provided with a cover letter addressing the purposes and instructions of the research. The respondents were given 2 weeks to return the completed questionnaires. However, after two weeks phone calls were made to the contact persons to encourage the return of more questionnaires. The packages, containing reminding letters, copies of questionnaire and reply-paid envelops, were sent out to the relevant key persons to improve the response rate.

5.3.3.2 Data Analysis Using Partial Least Squares

5.3.3.2.1 Partial Least Squares

The quantitative data collected from the main survey were analyzed using Partial Least Squares (PLS) based structural equation modeling (SEM) technique, which is a second generation multivariate data analysis tool (Barclay, Higgins & Thompson 1995; Chin 1998; Chin & Newsted 1999; McIntosh et al. 1996). The PLS approach provides a general model which maps paths to many dependent variables and analyze all the paths simultaneously rather than one at a time (Barclay, Higgins & Thompson 1995; Fornell & Bookstein 1982; Gefen, Straub & Boudreau 2000). The computer software used for data analysis in this research was PLS Graph version 3.0, which was developed by Professor Wynne Chin (http"//www.plsgraph.com; accessed 15/11/2005).

Structural equation modeling can be used to estimate relationships among dependent latent variables and the relationships among latent constructs and the underlying observed variables (Holmes-Smith 2000). It is allowed in SEM that the observed indicators of the higher-order latent constructs are not available. It also comprehensively deals with reliability and validity measure (Barclay, Higgins & Thompson 1995). According to Gefen, Straub and Boudreau (2000), there are basically two types of SEM: Covariance Based SEM (COV-SEM) and Partial Least Squares based SEM (PLS-SEM). The COV-SEM estimates model parameters to reproduce the covariance matrix of the observed variables and tests how well the hypothesized model fits the data. In PLS-SEM approach, parameters are estimated by maximizing the variables explained by a model which consists of latent and/or

observed variables. Compared to the COV-SEM, PLS-SEM has fewer demands on sample size and there is no need of normality assumption (Gefen, Straub & Boudreau 2000). It is suggested that the sample size in PLS should be more than ten times the number of predictors from (i) the indicators on the most complex formative construct, or (ii) the largest number of antecedent constructs leading to an endogenous construct as predictors in an Ordinary Least Squares (OLS) regression, whichever is greater (Barclay, Higgins and Thompson 1995). Barclay, Higgins and Thompson (1995) indicate that the measurement and structural parameters of a PLS causal model are estimated in an iterative fashion using traditional OLS simple and multiple regressions. At any given time, the iterative procedure is working with one constructs and a subset of measures related to that construct, or to adjacent constructs in the model. As the subset estimation process consists of simple and multiple regressions, the sample required is that which would support the most complex multiple regression encountered (Barclay, Higgins and Thompson 1995).

Partial Least Squares (PLS) based Structural Equation Modeling (SEM) differs from Covariance-based SEM in the types of relationship they support between the observed variables and their related latent constructs (Gefen, Straub & Boudreau 2000). PLS supports both types of observed variables, including reflective and formative observed variables, whereas covariance-based SEM only supports reflective observed variables (Gefen, Straub & Boudreau 2000). Formative indicators refer to the indicators that cause the latent construct and the construct is a function of the formative measures (Gefen, Straub & Boudreau 2000). Reflective indicators refer to the indicators that reflect the latent construct and are a function of the construct (Gefen, Straub & Boudreau 2000).

Under PLS, it is assumed that all the measured variance is useful variance to be explained and the latent constructs are estimated as exact linear combinations of the observed measures. However, this could be one limitation of PLS since so far no tools have been provided in PLS to deal with non-linear relations (Gefen, Straub & Boudreau 2000). Gefen, Straub and Boudreau (2000) also indicate that PLS has no established tools to overcome the issues of multicollinearity, outliers, heteroscedasticity and polynomial relationships.

There has been increased use of PLS among researchers lately due to the ability of PLS to model latent constructs under conditions of non-normality and small to medium sample sizes (Barclay, Higgins and Thompson 1995). Besides, PLS is suggested to be more suited when the measures are not well established or are used within a new measurement (Barclay, Higgins and Thompson (1995). Since the existing literature is deficient in providing a comprehensive research model for investigating knowledge management adoption and practice, the final research model proposed in this study is not based on a "strong" theory and is regarded as an estimate model that combines relevant theories and previous empirical research results. Therefore, the focus of this research is more on prediction applications and theory building, rather than testing the fit of a strong theory based model. With the arguments stated above, PLS is considered appropriate for the current study as the main survey data analysis technique.

5.3.3.2.2 Model Specification

The PLS model consists of two parts: the measurement model and the structural model. The measurement model represents the relations between the manifest variables, i.e., independent variables, and the latent constructs, i.e., unobserved variables, which they represent. The structural model specifies the relationships among the latent constructs (Cool, Dierickxx & Jemison 1989).

Where each unobserved latent construct in PLS is assigned a measurement range by constraining one of the paths from the latent construct to one of its indicator variables and assigning the value to this path to be 1.0. The remaining paths are thus estimated based on the constraint. The algorithm involved can be illustrated as the following two stages (Cool, Dierickxx & Jemison 1989). Firstly, the latent variables are assumed in an interactive manner to find a successive approximation. Alternations between the measurement and structural models are conducted where parameter estimates in either part of the model are treated as fixed as the parameters in the other part are estimated. Secondly, the measurement and structural convergence are presumed by regression using the latent variables estimated from the first stage (Cool, Dierickxx & Jemison 1989).

5.3.3.2.3 Data Analysis Procedures

The PLS model is typically analyzed and evaluated sequentially in two main steps (Barclay, Higgins & Thompson 1995; Hulland 1999). The first step is to assess each measurement model by examining individual item reliability, internal consistency and discriminant validity. The second step is to assess the structural model by performing the full SEM analysis. The data analysis procedures in PLS (Barclay, Higgins & Thompson 1995; Hulland 1999; Quaddus 2004; Santosa, Wei & Chan 2005) can be outlined in Table 5-2. More detailed discussions will be presented in the following sections.

Table 5-2 PLS Data Analysis Procedures

Step 1: Assessing measurement models
I. Item Reliability: item loadings $\geqq$ 0.7 II. Internal Consistency: (i) composite reliability $\geqq$ 0.7 (ii) AVE $\geqq$ 0.5 III. Discriminant validity: (i) Square root of AVE of a given construct $>$ correlation between this construct and other constructs; (ii) Item loadings of a construct $>$ all other cross-item loadings of this construct
Step 2: Assessing the structural model
I. Collect the standardized path loadings II. Test significance of the path loadings III. Produce R-square values and their interpretation as in regression analysis IV. Define the direct and indirect effects and their interpretation as in path analysis V. Revise the model where it is feasible

5.3.3.2.4 Assessment of Measurement Model

Assessment of the measurement model concerns with construct validity or the extent

to which the manifest indicators reflect their underlying constructs (Hanlon 2001; Santosa, Wei & Chan 2005). The construct validity is composed of convergent validity and discriminant validity (Santosa, Wei & Chan 2005). Convergent validity measures how closely the items in a single construct are correlated with each other, with high correlations indicating strong convergent validity (Govindarajulu & Reithel 1997). The convergent validity assessment included evaluating the individual item reliability and its internal consistency (Barclay, Higgins & Thompson 1995; Santosa, Wei & Chan 2005). Discriminant validity assesses the degree to which constructs in the PLS model differ from each other (Barclay, Higgins & Thompson 1995). The discriminant validity assessment involves evaluating the square-root of the Average Variance Extracted (AVE) and the cross loadings (Barclay, Higgins & Thompson 1995; Santosa, Wei & Chan 2005). Therefore, the adequacy of the measurement model can be assessed by examining the item reliability, the internal consistency and the discriminant validity (Barclay, Higgins & Thompson 1995; Hulland 1999; Santosa, Wei & Chan 2005).

5.3.3.2.4.1 Item Reliability

The item reliability analysis is used to estimate the amount of variance in the item's measure that is due to the construct (Barclay, Higgins & Thompson 1995). In PLS, individual item reliability is assessed by calculating the loadings, or simple correlations, of the measures with their respective construct (Barclay, Higgins & Thompson 1995). It should be noted that, for formative indicators, it is the weights that are estimated (Barclay, Higgins & Thompson 1995; Chin 1998; Santosa, Wei & Chan 2005). The weights reveal information about the relative importance of the formative indicators toward the creation/formation of the corresponding latent construct. Therefore, the assessment of item loadings is only appropriate for reflective indicators (Barclay, Higgins & Thompson 1995; Chin 1998; Santosa, Wei & Chan 2005).

A rule of thumb employed by several researchers is to accept items with loadings of 0.7 or more, indicating that there is more shared variance between the construct and its measure than error variance (Carmines & Zeller 1981; Hulland 1999). In other words, those items with lower loadings have a random error component that exceeds

the explanatory component and thus were dropped from further analysis to improve the item reliability.

According to Hulland (1999), low item loadings could be caused by the following problems: (i) imprecise wording in the questionnaire; (ii) using in appropriate items to measure constructs; or (iii) improperly transferring an item from one context to another. The first problem leads to low reliability, the second to poor content (and construct) validity, and the third to non-generalizability of the item across contexts and/or settings (Hulland 1999). While researchers might have a strong theoretical rationale for incorporating such items in their models, items with low loadings should be carefully reviewed, since they will add little explanatory power to the research model while reducing and hence biasing the estimates of the parameters linking constructs (Hulland 1999; Nunnally & Bernstein 1994). In this study, the criterion of 0.7 (Carmines & Zeller 1981; Hulland 1999) was applied to determine the sufficiency of the individual item reliability. Items with loading less than 0.7 were discarded based on the fact that the removing these items would not change or weaken the underlying constructs (Nunnally & Bernstein 1994).

5.3.3.2.4.2 Internal Consistency

Internal consistency is concerned to the measure of reliability of a particular construct (Barclay, Higgins & Thompson 1995). Researchers applying PLS commonly use the measure of internal consistency developed by Fornell and Larcker (1981). Fornell and Larcker (1981) propose composite reliability to assess internal consistency by computing the sum of the loadings, all squared, divided by the sum of the loadings, all squared, plus the sum of the error terms (Barclay, Higgins & Thompson 1995). It is argued that the measure of internal consistency is superior to Cronbach's alpha measure since the former uses the item loadings estimated within the casual model (Barclay, Higgins & Thompson 1995; Fornell & Larcker 1981). Fornell and Larcker's (1981) measure is not influenced by the number of items in the scale and thus is considered to be more general than Cronbach's alpha. However, the values obtained from both measures are interpreted similarly. Therefore, as with Cronbach's alpha, the benchmark of 0.7 suggested by Nunnally and Bernstein (1994) can be adopted to assess the internal consistency measure (Barclay, Higgins & Thompson

1995). Chin (1998) specified the value of internal consistency by using the following formula:

$$\rho_c = \frac{(\sum \lambda_i)^2}{(\sum \lambda_i)^2 + \sum Var(\varepsilon_i)}$$

where λ_i is the simple correlation/loading between items and their respective construct and $Var(\varepsilon_i) = 1 - \lambda_i^2$

Hulland (1999) indicates that low internal consistency can result from various causes, e.g., poor construct definition and construct multi-dimensionality. The incorrect construct definition would severely damage the determination of relevant and fitting measures for the construct. If the underlying construct is multi-dimensional, while it is measured using items which are assumed to be linked to a uni-dimensional construct, the measures as a group will produce poor internal consistency (Hulland 1999). The possible solution for the case of multidimensional construct is to split the construct into two construct or to remove items so that only a uni-dimensional construct remains (Hulland 1999). In addition, internal consistency is of minimal significance for formative indicators since they are intrinsically assumed not to be correlated with each other, nor they represent the same dimension (Gefen, Straub & Boudreau 2000; Santosa, Wei & Chan 2005). Accordingly, the evaluation of internal consistency is just conducted among the constructs with reflective indicators (Santosa, Wei & Chan 2005).

The other measure of internal consistency is concerned with assessing the Average Variance Extracted (AVE) for each construct, which indicate the amount of variance shared between a construct and its measures (Fornell & Larcker 1981). Chin (1998) suggests that the value of AVE can be obtained via the formula:

$$AVE = \frac{\sum \lambda_i^2}{\sum \lambda_i^2 + \sum Var(\varepsilon_i)}$$

where λ_i is the item loading and the variance $Var(\varepsilon_i) = 1 - \lambda_i^2$

For adequate reliability, a given construct is suggested to achieve a value greater than or equal to 0.5 (Fornell & Larcker 1981). Otherwise, the construct will be suspicious with its problematic reliability.

5.3.3.2.4.3 Discriminant Validity

Discriminant validity refers to the extent to which a particular construct differs from other constructs in the same model (Barclay, Higgins & Thompson 1995; Hulland 1999). The assessment of discriminant validity is carried out at both the construct and the indicator levels (Barclay, Higgins & Thompson 1995; Santosa, Wei & Chan 2005). At the construct level, a construct should share more variance with its measures than it shares with other constructs in the model. Therefore, discriminant validity is examined by comparing the square root of Average Variance Extracted (AVE) with the correlation of that construct with all other constructs (Barclay, Higgins & Thompson 1995; Santosa Wei & Chan 2005). To meet the requirement of discriminant validity, the square rooted AVE for every latent construct should be greater than the correlation between the latent construct with the other latent constructs (Barclay, Higgins & Thompson 1995; Hulland 1999; Santosa, Wei & Chan 2005).

Another discriminant validity assessment is associated with cross loadings. The cross-loading analysis in PLS measures the correlation of an item with respect to all of the constructs in the model, including the construct it intends to measure (Chin 1998). At the indicator level, for achieving satisfactory discriminant validity, an item should not load higher on other constructs than on the construct it intends to measure (Barclay, Higgins & Thompson 1995; Chin 1998). Chin (1998) comments that items violating such a rule can be considered to be excluded from the PLS model.

At this phase, the PLS Graph 3.0 software used in the current study does not produce

the statistics and thus they were computed separately by the researcher, using Excel spreadsheets with the output from PLS Graph 3.0. Because of formative variables' characteristics, such as that the correlations among formative indicators are not explained by the measurement, and specific guide of magnitudes does not describe the correlations among them, discriminant validity is thus considered not suitable for the constructs with formative indicators (Gefen, Straub & Boudreau 2000; Santosa, Wei & Chan 2005).

5.3.3.2.5 Assessment of Structural Model

The structural model comprises the hypothesized relationships between latent constructs in the research model (Santosa, Wei & Chan 2005). In the structural model, it is required to specify the relationships of the constructs and their indicators, i.e., reflective or formative (Hulland 1999). PLS allows analyzing the structural equation models with both reflective and formative constructs (Gefen, Straub & Boudreau 2000). The assessment of the structural model involves evaluating the explanatory power and the significance of the path coefficients (Barclay, Higgins & Thompson 1995; Santosa, Wei & Chan 2005).

The predictive power of the proposed research model can be assessed by obtaining the R-square values (Barclay, Higgins & Thompson 1995; Santosa, Wei & Chan 2005). Interpreting the values of R^2 in PLS research models is the same as that in explaining the R^2 values produced by multiple regression analyses (Barclay, Higgins & Thompson 1995). Therefore, R-square values will determine the explanatory power of a component of the model by indicating the amount of variance in the construct which is explained by its corresponding independent constructs (Barclay, Higgins & Thompson 1995).

To test the significance of the structural paths in the model, the value and significance of the path coefficients are estimated using the bootstrapping method. Bootstrapping procedures, or the alternative, jackknifing approaches, are commonly used in PLS analyses (Chin 1998). Using these non-parametric techniques allow the testing of the significance of parameter estimates from data which are not assumed to be multivariate normal in PLS (Barclay, Higgins & Thompson 1995; Chin 1998). The

choice between these two methods is based on a trade-off choice between computational time and efficiency (Chin 1998). According to Chin (1998), the bootstrapping procedures, using a larger number of resamples, takes more time in computation than the jackknife estimation. Nevertheless, the bootstrapping method is more efficient than the jackknife since the latter is considered as an approximation to the bootstrap. Since the bootstrapping calculations are performed via utilizing the PLS version 3.0 software, computational time is not considered to be an issue in this study. Accordingly, the more efficient method, bootstrapping, was adopted to assess the statistical significance of the structural paths in the research model.

5.4 Other Research Method Issues

The traditional research method that assumes universality is criticized by Adler (1984) as there are a few methodological concerns that must be addressed properly. While this study does not attempt to conduct comparative or cross-cultural research, the researcher needs to address the issue that the current study is administrated empirically in Taiwan where almost all the subjects of the field study and surveys were Chinese who had a national culture distinguishing from the West. As suggested by Usunier (1998), research that is centered on a specific country, generally where the researcher is from, can be seen as a comparative research design basically, though implicitly. In this type of study, the researcher aims at identifying distinctive management concepts and applications in a particular context.

Meanwhile, culture is believed to have impact on several aspects of research procedures (Adler 1984). Ferraro (1998) defines culture as everything that people have, think and do as members of their society. It is implied that people may think and do in different ways across various cultures. Therefore, in developing the research instrument from prior studies, of which a larger portion were in English, the researcher adapted the original instrument for use in the current study, due to differences in language and the research context with its own culture and preconception. Wright (1996) claims that research can hardly be free from cultural bias given that all assumptions, values, biases and beliefs are, whether intended or not, brought into research (Wright 1996). Simply translating an instrument from source language literally to the target language would risk the translation fidelity. Brislin

(1993) suggests that careful examination should be undertaken to meet equivalence of concepts and notions, such as translation equivalence, conceptual equivalence and metric equivalence. Therefore, the research conducted back-translation and pretest processes to maintain similar meanings considering certain issues in translating the instrument and identify that necessary adjustments were made for the instrument to be feasible in a different cultural context, e.g., Taiwan. Two bilinguals, expert in both English and Chinese, were involved in the back translation process and three knowledge workers in the field of life insurance and management were invited to precede the pretest. The feedbacks received from the back translation and pretest were used to improve the research instrument. More details are presented in Chapter 7.4.

5.5 Summary

This chapter presented two major research paradigms and described how they were applied in this study. The positivist viewpoint was used as the primary paradigm, while an interpretivist study was embedded to facilitate the positivist study to be more reliable in explaining the phenomenon of the dynamic world. The research was conducted in a number of phases. The first phase was to develop a preliminary research model based on extensive literature review. Using a mixed method approach, the factors and variables of the initial research model were validated and modified via a field study. The qualitative data collected for this phase were obtained by interviewing ten managers/staff from six life insurance companies in Taiwan. The interview scripts were transcribed by the research and the data were analyzed through content analysis techniques. A combined research model is thus produced in this phase.

The research hypotheses and a questionnaire were developed based on the combined research model. The questionnaire was empirically tested via a pilot survey. The feedbacks acquired from the pilot study were used to improve the questionnaire to be the appropriated instrument for the main survey. Finally, a nation-wide survey was administered to the managers and staff among the life insurance companies in Taiwan. The detailed description of the data collection and analysis procedures thought Partial Least Squares were provided. Furthermore, the issues regarding

international research and the appropriate adjustments, such as back-translation and pretest, were presented. In the following Chapter 6, the operation of the field study and the development of the combined research model will be presented.

Chapter 6 FIELD STUDY AND COMBINED RESEARCH MODEL

6.1 Introduction

This chapter details the analysis and findings of the field study and presents the combined research model. The focus of the field study was to corroborate and enhance the factors and variables in the tentative research model suggested in Chapter 4. The meanings of the factors and associated variables, as well as the relationships among the constructs were further examined via the field study. Six life insurance companies in various stages of knowledge management adoption and implementation were involved in the field study through ten interviews with key personnel. A protocol with semi-structured questions was used to collect the data from these interviews. Content analysis was then performed to generate the factors and variables identified in the field study. According to the results of the field study and referring to the literature, the final comprehensive research model was thus produced. A detailed discussion of the combined research model was presented in the last section.

6.2 Administration of Field Study

6.2.1 Sample Selection

The sample of this study relied on available subjects, who were close at hand or easily accessible (Berg 2004). The primary criterion for selecting the subjects was that they must be knowledge workers in their organizations. In addition, the participants were chosen based on the fact that they represented the life insurance companies involved in various stages of knowledge management adoption and applications. As presented in Chapter 3.2, there were twenty-one local life insurance companies and eight foreign life insurance companies legally approved to operate the life insurance business in Taiwan (Taiwan Insurance Institute 2006). Among the twenty-nine life insurance companies, ten persons, including managers and staff from six life insurance companies, were invited to participate in the field study. All the participants took part in this research on a voluntary basis and they were shown to have different individual background, such as position, tenure and gender.

6.2.2 Data Collection

The data was collected by using the semi-structured interview approach. All interviewees were contacted via phone in advance and provided with an interview information sheet (see Appendix A) explaining the background and purpose of the research. An interview protocol (see Appendix B) was designed based on the conceptual framework. The semi-structured interview protocol aimed at exploring the factors and variables affecting the adoption and practice of knowledge management in the life insurance enterprises. Development of the interview schedule followed the guidelines proposed by Berg (2004). The guiding semi-structured questions were as follows:

1. What is your perception of knowledge and knowledge management?
2. What would encourage you to consider the adoption of knowledge management?
3. What do you think are the main factors that may influence people's intention to adopt knowledge management in your organization?
4. What influences people's perception of knowledge management?
5. What would encourage people to adopt and apply knowledge management?

6. What do you think are the barriers to adopt and apply knowledge management in your organization?
7. What are the benefits of knowledge management to you?
8. What would enable you to adopt and implement knowledge management?
9. Do you think that the adoption and application of knowledge management is a normal practice in the life insurance industry?
10. What would make people more willing to adopt and apply knowledge management?
11. What would prevent people from adopting and applying knowledge management?
12. What are required to happen to apply knowledge management?
13. How do you see the impact of knowledge management practice on your organizational performance?

The pre-test interview was conducted using the guiding semi-structured questions to interview the first participant. With minor adjustments made based on the feedbacks from the pre-test interview, the guiding interview questions proved to be working well in achieving the research objectives of this study. Ten interviews in total were conducted in this exploratory field study. In four companies, two interviewees were allowed from each company to take part in this study to provide more fruitful details. The tacit knowledge derived from initial interviews was of such in-depth quality that it facilitated the refinement of the interview protocol and sharpened research directions. The interviews were audio taped whenever possible and field notes were immediately documented within three days in Taiwan so as not to lose the vital nuance and cues observed. The taped interviews were transcribed and rigorously reviewed for errors by the researcher. A sample interview transcript is provided in Appendix C. Tapes were carefully listened to following Strauss and Corbin (1990), and corrections made.

6.3 Data Analysis via Content Analysis

Content analysis was used to analyze the interview transcripts in this study. According to the content analysis approach (Berg 2004; Miles & Huberman 1994), the data collected from ten interviews were coded and categorized referring to the literature. The processes involved reviewing the interview transcripts and identifying

key words or phrases, among which the patterns were categorized under diverse codes that reflected the factors and variables of the tentative research model.

This study carried out the content analysis procedures via two stages (Berg, 2004; Miles & Huberman, 1994). Section 5.3.1.3 detailed the procedure of stage one.

The second stage of content analysis dealt with cross interview transcripts, and aimed at the integration of all the individual factors, variables and linkages from all interviews, in order to develop the comprehensive model of knowledge management adoption and practice in the context of life insurance companies in Taiwan. The stepwise procedures in the second stage were given in Section 5.3.1.3.

6.4 Results of Field Study

6.4.1 Background Information

Table 6-1 presents the background information of the companies involved in this field study. They were one foreign life insurance company, two local life insurance companies, and three local life insurance companies with foreign capital, some of which were new entrants whereas others were existing companies that had established for decades. The number of employees in the companies ranged from 300 to over 3000. All companies were involved in different stages of KM adoption and practice. The interviewees' positions varied from department manager to general staff and their tenures ranged from 4 years to 22 years. There were five female and five male participants respectively in the field study. The interviews took up to 1.75 hours according to the participants' working schedules. The last row of Table 6-1 shows the major knowledge management project, strategy, system or activities engaged in these companies.

Table 6-1 Background Information

Company	A	B	C	D	E	F
Type of Company	Local life insurance company	Local life insurance company	Foreign life insurance company	Local life insurance company with foreign capital	Local life insurance company with foreign capital	Local life insurance company with foreign capital
Company History	58 years	6 years	18 years	17 years	6 years	42 years
Size	Around 900 staff	Around 300 staff	3000 more staff	Around 300 staff	1000 more staff	3000 more staff
Position of Interviewee	Chief of Customer Service Section	1. Vice Manager of Human Resource Department 2. Manager of Education & Training Department	1. Sr. Deputy Manager of Admin. Service Section 2. General staff of Claim Department	1. Assistant Manager of Chief Information Officer (CIO) 2.Chief of Policy Alteration Section	Assistant Manager of Policy Assessment Department	1.Supervisor of Agency Training & Development Department 2. Manager of Claim Department
Tenure of Interviewee in the Company	22 years	6 years 7 years	14 years 4 years	16 years 15 years	9 years	11 years 13 years
Gender of Interviewee	Female	male male	Female Female	Female Female	Male	male male
Duration of Interview	1 hour	0.5 hour 1 hour	1.25 hours 0.75 hour	1.25 hours 0.25 hour	1.75 hours	1.25 hours 0.5 hour
KM Adoption/ Applications	Had some parts of KM	Had some parts of KM	Promoted KM actively for years	Adopted and applied KM widely for years	Started the initial stage of KM	Applied KM implicitly in the daily work
Knowledge Manager/ CKO	No	No	Used to have	Yes	No	No
Major KM Project/ Strategy/ System/ Activities	1.CRM System: data-mining & management of customer relationship 2.Web Meeting System: case studies & experience sharing 3. Identifica-tion of Standard Operation (ISO) System: gathering documents/ processes, creating the operation standards, and revising them regularly according to	1. Meeting & Speech Records: displayed in the public areas where everyone can read 2. "Palace of Lifelong Learning Web": classified PPO files and lectures with image /sound	1. KM Database 2. Standard Operation Process (SOP) Project: gathering and organizing electronic files/forms and operation processes and saving them in the computer system 3. CRM System: data-mining for designing new products that suited specific	1. KM Website: (i) Knowledge Bank (ii) Classified documents/ forms & operation processes/ booklets (iii) E-books: containing knowledge of underwriting, claim and customer service, etc. (iv) "Opinion Can Web": providing the	1. Project: submitted to explain the needs, requiremen ts and benefits of KM 2.KM system: developed initially 3.Project Team: assigned to promote the KM system	1. E-Lessons: organizing the current training materials 2. Website: (i) ISO documents/ regulations & administration booklets (ii) Fruitful sources of insurance professional knowledge 3. Co-used Data File: the staff's thoughts, experience and methods shared among one another; one person assigned to

	changes 4. Process Simplification Project: encouraging proposals /suggestions that can improve and simplify the current operation processes		groups of customers 4.E-Learning System: (i) new missions transmitted (ii)training programs provided by the "ING University System" 5. "Claim Principles": legal and medical experience from previous cases shared 6. KM Annual Plan: requiring KM required to be part of the annual plans proposed by each department/ section	opportunity for proposing opinions (v) "Message Web": the relevant department should reply to any message sent anyone who has enquiries (vi) "Proposal Web": encouraging employees to submit proposals or new ideas 2. Knowledge Officer: at least one knowledge officer in each department 3. Identification of Standard Operation (ISO) 4. Operation Principles: the main points from previous experience		identify and classify the data 4. Regular case studies: the staff required to gather related regulations/ professional knowledge for certain topics and present the results to other workers

6.4.2 Factors and Variables of KM Adoption and Practice

Twelve factors and ninety-three variables were identified from the field study using the techniques of content analysis as described earlier. The obtained factors and variables regarding knowledge adoption and practice are presented in Table 6-2. This table shows the list of variables identified in each factor, as well as the companies which mentioned the variables. The interview data were coded and categorized via cross-referencing to factors and variables of the tentative research model (as presented in Chapter 4), which was developed in accordance with the literature. However, in the field study, some of the factors and variables were identified different from earlier studies. The variables gathered within each factor and their meanings were more specific in the context of knowledge management

adoption and applications among Taiwan life insurance enterprises.

Table 6-2 Factors and Variables of KM Adoption and Practice

Factor	Variable	Company					
		A	B	C	D	E	F
Environments & Industrial Factors	Industrial competition	✓		✓			✓
	Trend	✓		✓	✓		✓
	Rules and regulations	✓					
	Customer complains and disputes	✓					
	High development of IT				✓		
	Use of a great amount of paper				✓		
Individual Characteristics	Educational background		✓	✓	✓		✓
	Position	✓	✓	✓	✓		
	Work domain	✓					✓
	Computer background and skill	✓	✓	✓	✓		
	Individual innovativeness	✓	✓	✓		✓	
	Work attitude	✓	✓	✓		✓	✓
	Personality	✓	✓			✓	✓
	Habit of using computers and internet			✓	✓		
	Loyalty and belonging to the company	✓					✓
IT Support	Hardware infrastructure	✓	✓	✓	✓	✓	✓
	Software infrastructure	✓	✓	✓	✓	✓	✓
	Correct and integrated information	✓		✓	✓		✓
	Compatibility	✓	✓	✓			
	Function	✓			✓	✓	✓
	Data updating and maintenance				✓	✓	
	Testing and adjustment				✓	✓	✓
	Security of data and system	✓		✓	✓		
	Cooperation and communication			✓	✓	✓	✓
	Funny and interesting design			✓	✓		

KM Promotion	KM manager	✓	✓	✓	✓	✓	✓
	KM plan or project			✓	✓	✓	✓
	KM team		✓	✓	✓	✓	✓
	Top management support	✓	✓	✓	✓	✓	✓
	Human and financial support	✓	✓				✓
	Transmission of the KM mission		✓	✓	✓	✓	
	Time schedule and guidelines	✓	✓			✓	✓
	Training			✓			✓
	Participation of the department representatives		✓		✓	✓	✓
	Support of time and space	✓		✓		✓	
	Knowledge transfer channel	✓	✓	✓			
	Knowledge type			✓		✓	✓
	Reward for KM			✓		✓	✓
	KM performance evaluation	✓	✓		✓		
Organizational Characteristics	Size	✓		✓		✓	
	Structure			✓			✓
	Vision, value and objective	✓	✓	✓	✓	✓	✓
	Strategy and policy	✓	✓	✓	✓	✓	
	Organizational learning	✓	✓	✓			
	The system for duty rotation and acting duty	✓			✓		✓
	Employee turnover rate			✓		✓	
	History of organization			✓			
	Variety of product			✓			
Cultural Factors	Knowledge-intensive culture	✓	✓		✓		✓
	Team-work culture	✓		✓		✓	✓
	Trust and commitment	✓		✓	✓	✓	✓
	Respect			✓	✓	✓	✓
Perceived Usefulness	Work and service quality	✓	✓				
	Work quantity	✓	✓				
	Time saving	✓	✓	✓	✓	✓	✓

	Efficiency	✓	✓		✓		
	Making it easier to work	✓		✓			
	Convenience and flexibility	✓		✓	✓	✓	✓
	Meeting the needs at work	✓					✓
	Effectiveness			✓	✓		
	Professional competency	✓	✓			✓	✓
	Reducing the mistakes				✓		
	Reducing the duplicate work		✓				
	Making it easier to learn				✓	✓	
Complexity	Not friendly to use				✓	✓	✓
	Taking too much time				✓	✓	✓
	Not simple, clear and short enough			✓			
	No assistance in time	✓					✓
	Lack of accessibility				✓	✓	✓
	Not easy in the practical operation	✓	✓				✓
Subjective Norm	Peer pressure	✓			✓		✓
	Co-workers' adoption and comments			✓			
	Supervisor		✓				✓
	Senior management			✓			
	Opinion leader						✓
	Requirement of company	✓	✓			✓	
Attitude toward KM Adoption	Attitude toward KM Adoption	✓	✓	✓	✓	✓	✓
KM Practice	Gathering knowledge	✓	✓	✓	✓	✓	✓
	Identifying Knowledge			✓			
	Organizing knowledge		✓	✓	✓	✓	✓
	Sharing knowledge		✓		✓	✓	✓
	Converting knowledge		✓			✓	
	Using knowledge		✓			✓	
	Having know management a part of ordinary jobs			✓	✓		✓
Perceived	Customer service	✓		✓		✓	✓

Expected Performance	Overall operational efficiency	✓	✓	✓	✓	✓	
	Cost down		✓	✓	✓	✓	✓
	Ability to adapt to changes	✓					
	Reputation and public praise			✓		✓	
	Improving workers' quality			✓			
	Providing information for decision makers				✓		
	Keeping the record of workers' experience in the company			✓	✓		
	Decreasing the impact of turnover				✓		✓

All companies recognize the twelve factors. Out of the ninety-three variables, the seven variables confirmed by all companies were: hardware infrastructure, software infrastructure, KM manager, top management support, vision, value and objective, time saving, as well as attitude toward KM adoption. In the meantime, twenty-one variables were declared by more than four companies. Most of the companies proposed that a person's work attitude would influence the person's perception regarding knowledge management. Having the KM team, taking the appropriate strategy and policy, as well as creating a culture of trust and commitment were also considered essential to put knowledge management into place. Although the variables of "high development of IT" and "use of a great amount of paper" were simply mentioned by one company, they might be specific for the life insurance companies and the issues of KM in Taiwan.

In regard with the number of variables provided by the companies, company C, the foreign company which actively promoted KM for years, indicated fifty-five variables; company F, the local company with foreign capital, which applied KM implicitly in the daily work, identified fifty variables. However, company D, the company which had adopted and operated knowledge management generally in the organization for more than five years, only pointed out thirty-five variables. It was interesting to note that, the company which had applied knowledge management to the level that KM had become a part of its ordinary jobs mentioned the least variables in this field study. The rationale could be that knowledge management

had been deeply embedded in company D's daily operation and the associated problems had been solved gradually in the beginning few years. The interviewee from Company D mentioned that the employees had been used to the concept and use of knowledge management, and therefore some concerns regarding the adoption and practice of knowledge management in other companies, such as the training for introducing KM to the employees and support of time and space for knowledge sharing and other KM related activities, would no longer be an issue in this company.

6.4.3 Linkage among the Factors

Table 6-3 presents the linkages among the factors of knowledge management adoption and practice. The information regarding the perceived links was sought during the interview process and was extracted from the interview scripts through content analysis techniques as described earlier. For example, the linkage from environments and industrial factors to perceived usefulness was identified in company A based on the statement that, "in the trend that KM has been applied in many organizations, adopting KM would help improve our performance at work and let us feel more competent", which was made by its representing participant in the field study (see Appendix C). Column 1 of Table 6-3 specifies the pairs of factors and corresponding linkages. For instance, it is indicated in row 1 of Table 6-3 that environments and industrial factors have impacts on perceived usefulness and this linkage has been identified in companies A, B, C, D and F.

Table 6-3 Linkage among the factors

Linkage between Factors	Company					
	A	**B**	**C**	**D**	**E**	**F**
Environments and Industrial Factors → Perceived Usefulness	✓	✓	✓	✓		✓
Individual Characteristics → Perceived Usefulness	✓	✓	✓		✓	✓
Individual Characteristics → Complexity	✓	✓	✓	✓	✓	✓
Individual Characteristics → Attitude toward KM Adoption	✓					✓
IT Support → Perceived Usefulness	✓	✓	✓	✓	✓	✓

IT Support → Complexity	✓	✓	✓	✓	✓	✓
Knowledge Management Promotion → Perceived Usefulness	✓	✓	✓	✓	✓	✓
Knowledge Management Promotion → Complexity	✓				✓	✓
Organizational Characteristics → Perceived Usefulness	✓	✓	✓	✓	✓	✓
Organizational Characteristics → Complexity						✓
Cultural Factors → Perceived Usefulness	✓	✓	✓	✓		
Cultural Factors → Subjective Norm		✓	✓	✓	✓	✓
Perceived Usefulness → Attitude toward KM Adoption	✓	✓	✓	✓	✓	✓
Complexity → Attitude toward KM Adoption		✓	✓	✓	✓	✓
Complexity → Perceived Usefulness	✓				✓	
Subjective Norm → Attitude toward KM Adoption	✓	✓	✓	✓	✓	✓
Attitude toward KM Adoption → Knowledge Management Practice	✓	✓	✓	✓	✓	✓
Knowledge Management Practice → Perceived Expected Performance	✓	✓	✓	✓	✓	✓

It was indicated that all companies, from their representing participants, recognized the following relationships: individual characteristics to complexity, information technology support to perceived usefulness and complexity, knowledge management promotion and organizational characteristics to perceived usefulness, perceived usefulness and subjective norm to attitude toward KM adoption, attitude toward KM adoption to knowledge management practice, as well as knowledge management practice to perceived expected performance. Distinct from the tentative research model, the participants of company A and F suggested that individual characteristics would directly affect a person's attitude in adopting knowledge management. The interviews from companies A, B, C and D argued that cultural factors would have direct impacts on perceived usefulness. According to Table 6-3, the casual models of knowledge management adoption and practice can be traced for individual firms. Figure 6-1 to Figure 6-6 present the casual models of knowledge management adoption and practice as perceived by the companies A to F respectively.

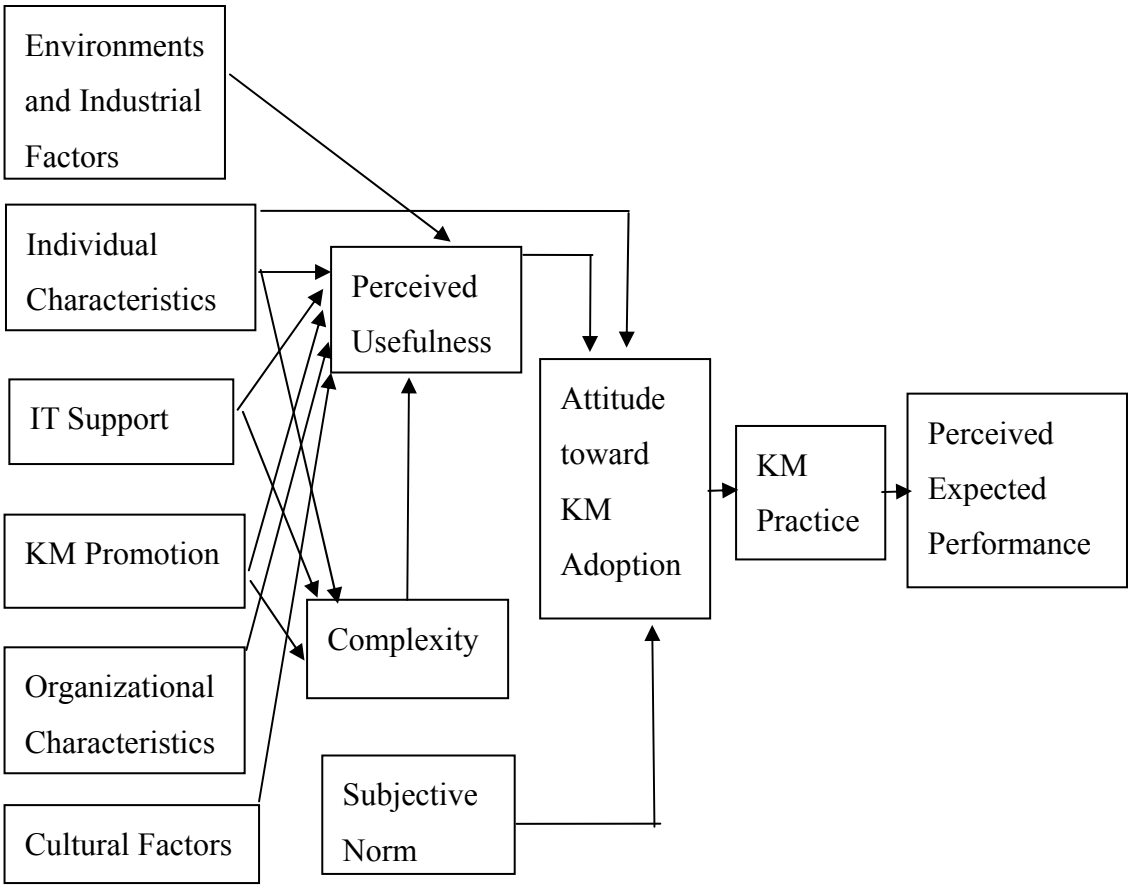

Figure 6-1 KM Adoption and Practice Model of Company A

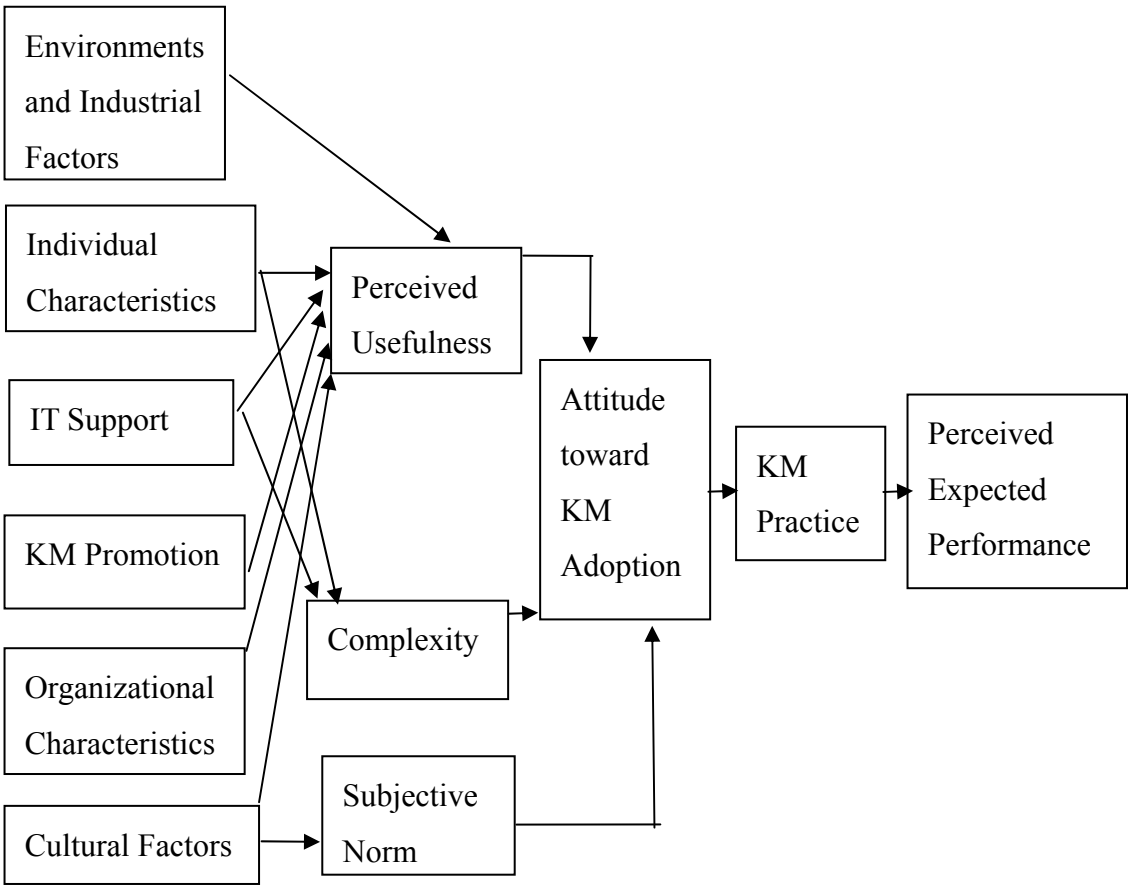

Figure 6-2 KM Adoption and Practice Model of Company B

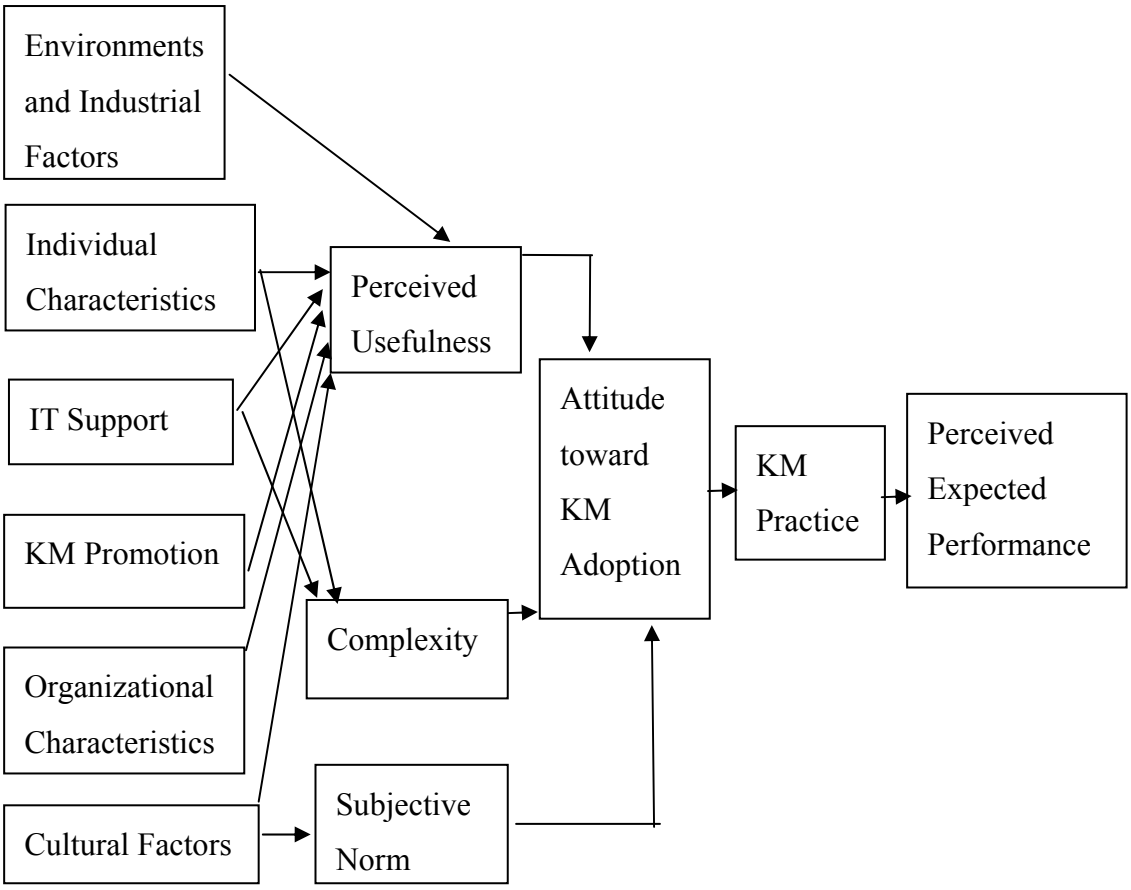

Figure 6-3 KM Adoption and Practice Model of Company C

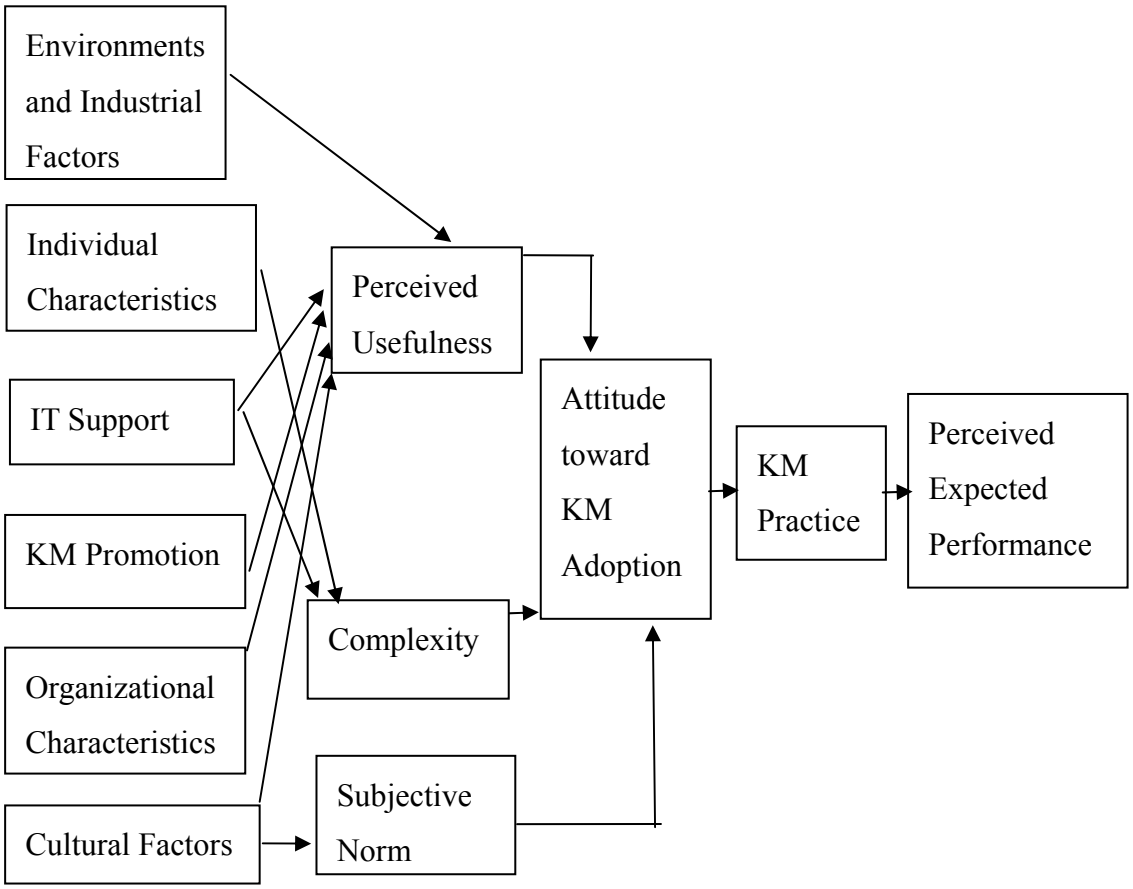

Figure 6-4 KM Adoption and Practice Model of Company D

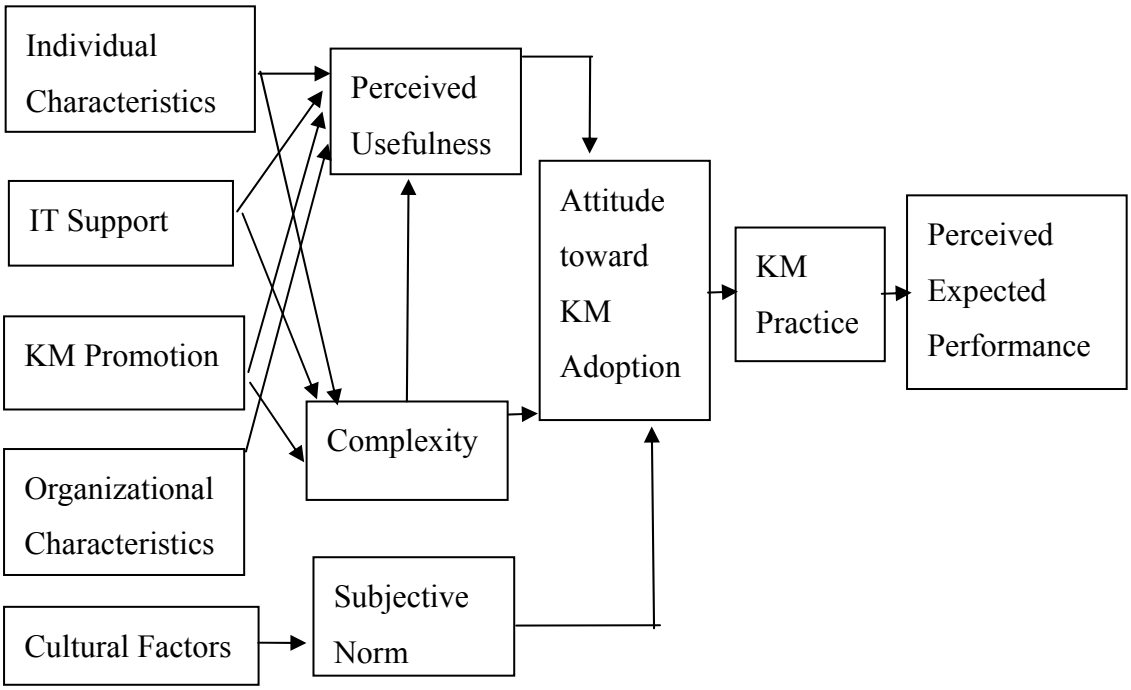

Figure 6-5 KM Adoption and Practice Model of Company E

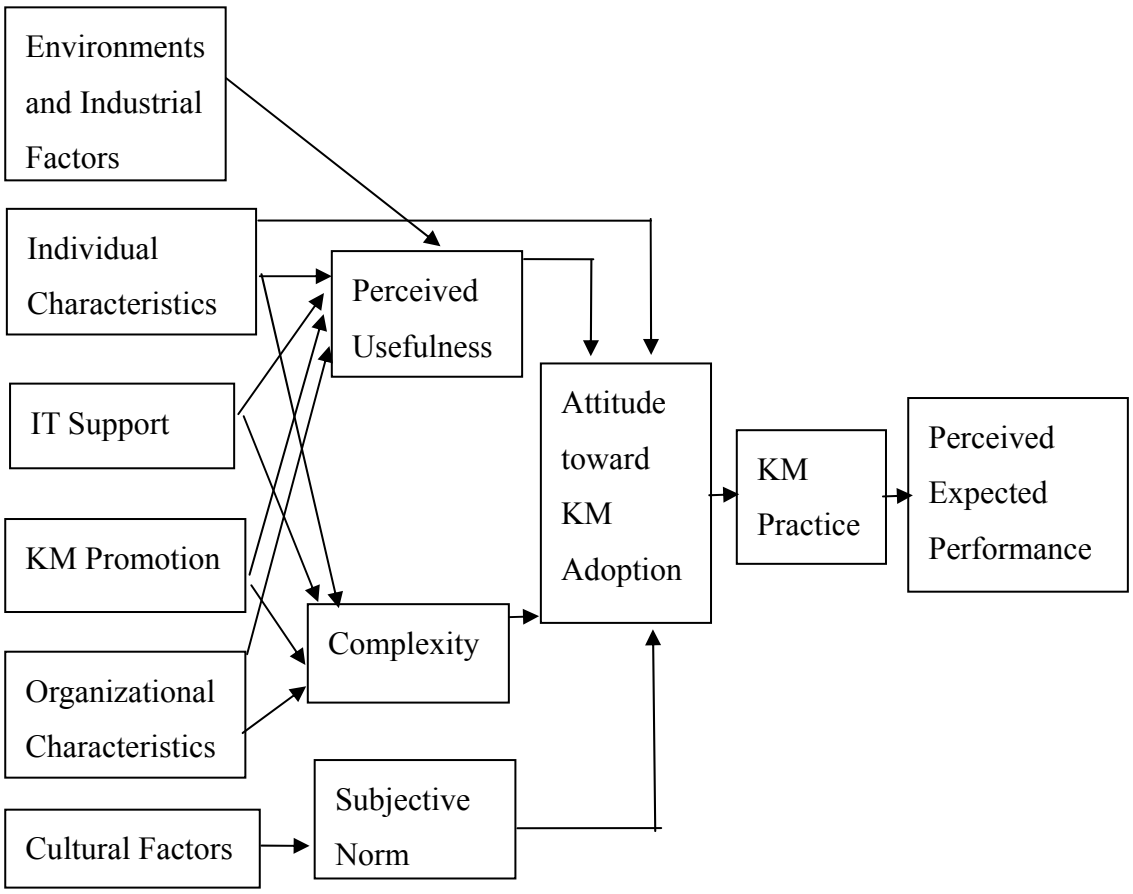

Figure 6-6 KM Adoption and Practice Model of Company F

6.5 Combined Research Model

Knowledge management, referring to new ideas and practices for Taiwan life insurance, is viewed as an innovation in this study. Accordingly, the adoption and practice of knowledge management is identified to be the process by which knowledge management is communicated through certain channels over time among the members of a life insurance enterprise and diffused in the enterprise (Rogers 1995). Besides, while not all knowledge management projects include the implementation of new systems, information technologies play a significant role in supporting the applications of knowledge management in several ways (Alavi & Leidner 2001), and this was particularly true in Taiwan life insurance companies' practical experiences (Yang 2004). It thus justifies the use of the theory of Innovation Diffusion (ID) (Rogers 1995), along with Technology Acceptance Model (TAM) (Davis 1986) and the Theory Reasoned Action (TRA) (Ajzen & Fishbein 1980) to develop the tentative research model as proposed in Chapter 4, suggesting that the external factors influence the perceptive factors that via attitude indirectly affect knowledge management practice, which in turn would influence the perceived performance of the organization.

The field study generally validated the framework of the tentative research model. The interviewees provided their practical opinions to fine-tune the factors/variables, and two more linkages between the factors were found from the field study, to make the research model more appropriate to explicate the adoption and practice of knowledge management in the scenario of Taiwan life insurance industry. It was suggested that "environments", "information technology" and "knowledge management characteristics" of the external factors in the tentative research model, should be modified as "environments and industrial factors", "information technology support" and "knowledge management promotion', to better presenting the terminology of the factors in the operational version of the research model. Besides, there was a view from the field study that individual characteristics had impacts on the attitudinal factor, not only on perceived usefulness and complexity. Cultural factors were also considered to have impacts on perceived usefulness, in addition to its influences on subjective norm.

Therefore, based on the preceding discussions, the combined research model is proposed in Figure 6-7. It combines the literature review and the findings from the field study. The constructs and associated variables identified in the combined research model are described further in the following sections.

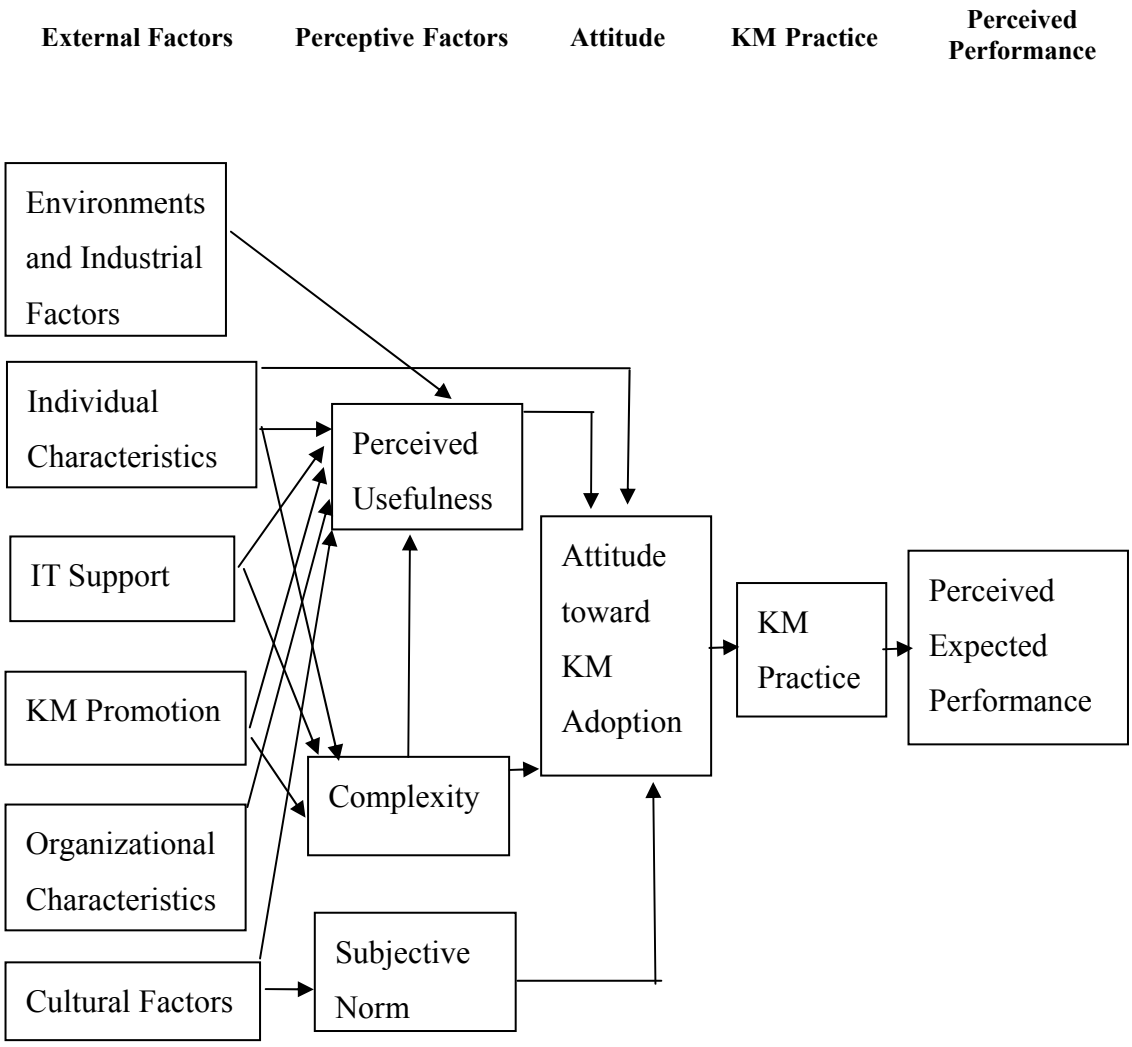

Figure 6-7 Combined Research Model

6.5.1 External Factors

External factors have been identified to have influences on behavior via beliefs, e.g., perceived usefulness and subjective norm (Ajzen & Fishbein 1980; Davis, Bagozzi & Warshaw 1989; Igbaria, Guimaraes & Davis 1995; Szajna 1996). The external factors identified in the combined research model include environments and industrial

factors, individual characteristics, information technology support, knowledge management promotion, organizational characteristics and cultural factors.

6.5.1.1 Environments and Industrial Factors

Environmental factors have been shown to be associated with system adoption (Grover 1993) and diffusion (Belassi & Fadlalla 1998), as well as the success of knowledge management in organizations (Hung, Hui-Shu 2003). In addition, several participants in the field study expressed that the specific characteristics of life insurance industry, such as requiring plentiful documents and consuming enormous amount of paper, would arouse the interests of employees (particularly the managers) to accept knowledge management, in order to reduce the costs and enhance the efficiency. Therefore, environments and industrial factors are adopted in this research to examine the external factors in this context. Similar to the "external environmental changes" identified by Hung, Hui-Shu (2003), the interviewees from companies A, C, D and F further clarified that it was the "trend" that would have impact on their perceptions in feeling the need of adopting or implementing knowledge management. The interviewee from company A pointed that, in the life insurance industry, customers' demands would be recognized by the employees via "customer complaints and disputes". The participant from company D, which had applied knowledge management for years, emphasized that the prosperity of information technology in Taiwan created a mature environment for initiating knowledge management, and the huge expenditure of paper pushed the life insurance companies to sincerely consider the need of knowledge management. Through the literature and the field study, there are industrial competition, trend, rules and regulations, customer complains and disputes, high development of IT and use of a great amount of paper, identified as the variables of "environments and industrial factors".

6.5.1.2 Individual Characteristics

The combined research model identifies educational background, position, work domain, computer background and skill, individual innovativeness, work attitude, personality, habit of using computers and internet, as well as loyalty and belonging to the company, to be the variables of individual characteristics. In the literature,

education (Ajzen & Fisbein 1980; Lo 2003), position (Lo 2003), computer skill/experience (Lo 2003; Liu 2004), individual innovativeness (Rogers 1995) and personality (Ajzen & Fishbein 1980; Chang 2002) have been considered to be the individual features that may affect people in perceiving the value of knowledge management. However, the participants from company A, B, C, E and F highlighted that a person's working attitude would influence greatly the person's opinions regarding accepting knowledge management or implementing knowledge management. The participants from companies C and D, which were shown to have more experiences in managing knowledge than others, mentioned that the employees' habits in using computers and internet would have effect on their feeling about knowledge management. On the other hand, the participants from companies A and F, simply applying knowledge management implicitly in their organizations, put their emphasis on the loyalty among the employees to the company, which was believed to be significant in deciding the employees' perceptions regarding whether knowledge management was valuable to them.

6.5.1.3 Information Technology Support

During the field study, the participants identified that information technology played an important role in facilitating the applications of knowledge management. The previous studies have suggested several information technology aspects, e.g., technology infrastructure (Alavi & Leidner 1999; Gold, Malhotra & Segars 2001; Liu 2004), system characteristics (Lo 2003), corrected and integrated database (Alavi & Leidner 1999), compatibility (Agarwal & Prasad 1997; Thong 1995), function (Chiu 2004), adaptation to changes (Alavi & Leidner 1999), trialability (Agarwal & Prasad 1997) and security of information (Alavi & Leidner 1999), would have impacts on the adoption or usage of a new system or novel technology. Complying with the literature, more than a half of the companies through their representing participants in the field study, agreed that hardware infrastructure, software infrastructure, precise information, testing and adjustment, as well as the security of data and system, would be the main concern in adopting and implementing knowledge management.

Moreover, the participants from companies C, D, E and F stressed that the IT persons should have adequate communication with the users to realize their real needs and

cooperate with the general staff in the administrative sections to accomplish the tasks of knowledge management. The participants from companies C and D provided their experiences by indicating that designing funny or interesting program, such as searching for treasures and on-line games, would effective stimulate the employees, particularly for those who were in the ages of 20-35, to use the knowledge management system. Therefore, the variables of information technology support in the combined research model consist of hardware infrastructure, software infrastructure, correct and integrated information, compatibility, function, data updating and maintenance, testing and adjustment, security of data and system, cooperation and communication, as well as funny and interesting design.

6.5.1.4 Knowledge Management Promotion

Successful knowledge management requires motivational schemes (Davenport & Glaser 2002). Davenport (1996) describes that the natural tendency of human beings is to hoard their knowledge and look suspiciously upon others' knowledge. Thus, sharing and use of knowledge should be highly motivated. Viewing knowledge management as an innovation for Taiwan life insurance industry, putting knowledge management into place involves both individual innovation diffusion and organizational innovation diffusion. Rogers (1995) suggests that, before an individual making the decision to adopt or reject the innovation, he or she would need to learn of the existence of such an innovation and obtain some understanding of how it functions. At the level of organizational innovation diffusion, "initiation" stages include information gathering, conceptualizing and planning for adopting the innovation (Rogers 1995). After an organization recognizes the need for an innovation from a general problem, the problem from the organization's agenda would be matched with an innovation, and this match should be planned and designed. Theses initiating schemes would influence the individuals in forming their knowledge regarding the innovation, e.g., knowledge management in this study, and attitudes toward such an innovation. Therefore, the employees' thoughts about knowledge management is suggested to be influenced by some characteristics of knowledge management scheme in the organization, such as Chief Knowledge Officer (Davenport 1996), self-contained task team (Alavi & Leidner 2001), support from top management (Davenport & Glaser 2002), resources (Rogers 1995), guiding principles

(Chait 1999), participation (Liou 2004; Hung, Mao-Sheng 2003), knowledge diffusion channel (Wang, Chia-Hung 2002), knowledge type (Alavi & Leidner 2001; Wang, Chia-Hung 2002), Compensation policies and reward, (Barney 1997; Davenport 1996) as well as evaluation system (Alavi & Leidner 1999; Rogers 1995).

All of the interview participants responded that having the promoting schemes before implementing knowledge management were crucial. According to their opinions, "knowledge management promotion" is considered more definite to identify the features in such schemes before the implementation of knowledge management. The participants provided the related terminology in their practical experiences to fine-tune the variables in this construct and identified the following items: knowledge management manager, knowledge management plan or project, knowledge management team, top management support, human and financial support, transmission of the knowledge management mission, time schedule and guidelines, training, participation of the department representatives, support of time and space, knowledge transfer channel, knowledge type, reward for knowledge management, as well as knowledge management performance evaluation.

6.5.1.5 Organizational Characteristics

Rogers (1995) maintains that organizational characteristics, such as size and structure, will have effects on the organization's innovativeness. The organizational structural characteristics, e.g., system openness, are considered to be related to organizational innovativeness. Theses structural characteristics can be obtained via the predetermined goals, authority formation and rules of the organization (Rogers 1995). Chait (1999) indicated that the vision, value and objective of an organization played an important role in effectively managing knowledge in the organization. Yang (2004) specifically noted that the life insurance companies in Taiwan should have explicit strategies and policies to embark on knowledge management. Moreover, Lu (2002) reported that organizational learning would affect the perceptions of knowledge management in the life insurance industry.

In addition to the variables identified in the literature, i.e., size, structure, vision, value and objective, strategy and policy, as well as organizational learning, four other

aspects were arisen from the field study to have influences on employees' evaluation regarding knowledge management. The participants from company A, D and F expressed that the system for duty rotation and acting duty in an organization would affect the employees in perceiving whether knowledge management was useful for them and whether learning from others' knowledge management was difficult or not. Their support for this argument could be shown in the statements such as that, "Job rotation would force us to learn the tasks of others in various divisions", and that, "the acting person will do my jobs on my behalf while I am off". They explained that they needed to teach the acting persons how exactly their tasks should be undertaken, in order to have a "peaceful" and not disturbed vacation. One participant of company C argued that history of organization, e.g., new entrant and existing company, would have impact on the employees in thinking the worth of knowledge management and its associated difficulties. In the meantime, the participant indicated that the types and varieties of life insurance policies sold by the company would affect people in deciding whether or not to accept knowledge management. "I could almost remember all the terms and regulations of our products while I just came into this company ten years ago, since there were only around ten policies then. However, now I have to rely on the computer system that allows me to quickly review the present terms/regulations and others' experience in dealing with various cases. We all feel that the knowledge management project is getting more and more important for us because our company have been developing new products and there are currently more than fifty policies in force.", the participant via the statements above provided the rationale.

6.5.1.6 Cultural Factors

Previous studies have identified that cultural factors, such as knowledge-intensive culture (Alavi & Leidner 2001), collective culture (Alavi & Leidner 2001), as well as trust and commitment (Brand 1998; Hung, Hui-Shu 2003; Liou 2004), have significant effects on the adoption and practice of knowledge management. Chait (1999) postulates that the linkage of knowledge management to the cultural issue is critical. Cultural realities can act as either barriers or enablers for having knowledge management into place (Chait 1999). On one hand, a knowledge-friendly culture could result in successful knowledge management (Davenport & Prusak 1998). On

the other hand, culture might be the main hindrance for people in creating and sharing knowledge.

There was a general agreement among the participants in the field study that cultural factors significantly affect the thoughts and behaviors of the employees in adopting and applying knowledge management. The participants from companies C, D, E and F specifically identified that a culture with respects to both the employees and customers could create an environment in which people were more willing to contribute their knowledge and share the knowledge with others. Besides, three items pertaining to cultural knowledge management infrastructure suggested by Gold, Malhotra and Segars (2001) are adopted in this study. The items comprised the following statements: (i) employees are encouraged to explore and experiment; (ii) employees are encouraged to ask others for assistance when needed; and (iii) employees are encouraged to discuss their work with people in other workgroups. These measurements were utilized in the current study since they signified the real conditions that could create the infrastructure affiliating knowledge management in the facet of culture.

6.5.2 Perceptive Factors

The perceptive factors, including perceived usefulness, complexity and subjective norm, were proposed to be significant in forming people's attitudes toward knowledge management adoption and thus affect the practice of knowledge management based on the previous studies. During the field study, there was a general agreement among the interviewees from all companies that these perceptions were essential in determining a person's attitude in adopting and implementing knowledge management.

6.5.2.1 Perceived Usefulness

The TRA model proposes that a person's beliefs that the behavior leads to certain outcome and his or her evaluation regarding the outcome will affect the person's attitude toward the behavior (Ajzen & Fishbein 1980). More specifically, Davis (1986; 1989) suggested that perceived usefulness, defined as "the degree to which a person believes that using a particular system would enhance his or her job

performance, would be significant in influencing the acceptance or usage of a new system or technology. There have been several items identified in the past research to measure the construct of perceived usefulness. They included improvement of work quality (Davis 1993; Moore & Benbasat 1991), increase of productivity (Davis 1989, 1993; Davis, Bagozzi & Warshaw 1989, 1992; Venkatesh et al. 2003), time reduction (Davis 1989, Davis, Bagozzi & Warshaw 1989; Moore & Benbasat 1991; Venkatesh et al. 2003), enhancement of effectiveness (Compeau & Higgins 1995; Compeau, Higgins & Huff 1999; Davis 1989, 1993; Davis, Bozzi & Warshaw 1989, 1992; Thompson, Higgins & Howell 1991), making it easier to do the job (Davis 1989; Davis, Bagozzi & Warshaw 1989; Moore & Benbasat 1991) and increasing the chances of obtaining a promotion or getting a raise (Compeau & Higgins 1995; Compeau, Higgins & Huff 1999; Venkatesh et al. 2003).

Most of the items measuring perceived usefulness in the literature refer to the adoption or usage of new technology. To explore the construct of perceived usefulness in a context of knowledge management adoption and practice, the interviewees' opinions were used to amend the variables of perceived usefulness in this research. The construct of perceived usefulness in this study is concerned with what aspects are perceived by the employees that knowledge management would be useful in improving their job performance. The participants from all companies stressed that it would be considered beneficial if knowledge management could really save their time at work. The participants from company A and B suggested that knowledge management could enhance the employees' work quality, in which service quality was usually the focus in the life insurance industry. The participants from companies A, C, D, E and F indicated that the applications of knowledge management would let them have more flexibility in dealing with a great deal of work everyday. In addition, knowledge management was perceived to be helpful in enhancing professional competency, reducing the mistakes and duplicate work, as well as making it easier to learn from other's knowledge and experience.

6.5.2.2 Complexity

According to Rogers (1995), complexity is defined in this study as the degree to which knowledge management adoption and practice is perceived as difficult to understand

and use. New ideas, e.g., knowledge management plans, that are easier to grasp are adopted more rapidly than innovations that require the adopter to develop new skills and understanding. To examine the construct of complexity, the past studies have identifies the related items using the following statements: (i) working with the system is so complicated; it is difficult to understand what is going on (Thompson, Higgins & Howell 1991); (ii) it takes too long to learn how to use the system to make it worth than the effort (Thompson, Higgins & Howell 1991); (iii) Interacting with X system is often frustrating (Davis 1993); (iv) Interacting with X system requires a lot of mental effort (Davis 1993); and (v) I find it take a lot of effort to become skillful at using X system (Davis 1993).

The items described above mostly refer to the complexity involved in using a new system. To exploit these items to look at the complexity regarding knowledge management, the participants' opinions were gathered from the field by asking what kind of situations would let them feel that knowledge management was difficult for them to use and apply. The participants declared that they would feel that knowledge management was complex when: (i) the related information system was not friendly to use; (ii) it took too much time to find the information they need; (iii) the associate message was not simple, clear and precise enough; (iv) there was not immediate assistance while the problems occurred; (v) it was not accessible to get the information or knowledge required; and (vi) the knowledge management scheme or project was not easy to operate in practice. The meanings of the perceived complexity in the context of knowledge management adoption and applications were thus clarified via the field study.

6.5.2.3 Subjective Norm

It is proposed that a person who believes that most referents with whom the person is motivated to comply think he or she should perform the behavior will perceive social pressure to do so (Ajzen & Fishbein 1980). Rogers (1995) identified social system as an essential element in the diffusion of innovations. According to Rogers (1995), the system norm is the established behavior pattern that tells the members of the social system what behavior they are expected to perform. Basically, the participants of the field study confirmed the variables that were identified to reflect the subjective norm

in the setting of knowledge management adoption and practice. The construct of subjective norm in the combined research model is considered to be composed of the following aspects: (i) pressure from the peer that they think a person should adopt and apply knowledge management; (ii) how many colleagues have accepted and applied knowledge management as well as their comments; (iii) supervisor's attitude and opinion.; (iv) encouragement of senior management; (v) influence of opinion leaders; (vi) requirement of the organization; and (v) enhancing a person's prestige, profile or status for his or her adopting/applying knowledge management.

6.5.3 Attitude toward KM Adoption

"Attitude" is defined as an individual's positive or negative evaluation of performing a particular behavior and identified to be the essential personal factor in influencing the behavior (Ajzen & Fishbein 1980). In this study, the behavior refers to knowledge management adoption. Accordingly, the factor of attitude toward knowledge management adoption is concerned with the judgments among the employees regarding whether they are in favor of or against adopting knowledge management.

During the interviews, there was a general agreement among the participants that the attitude knowledge management adoption would have significant effects on the practice of knowledge management. All participants stressed that the, before implementing knowledge management, the staff and managers' attitudes would determine whether such a project or plan would succeed eventually. One participant from company E maintained that, "Attitude decides everything". He expressed that, a person could accomplish any difficult task as long as he or she had positive attitude toward the task. However, despite that the attitudinal factors were highlighted among the interviewees, they did not clearly identify the variables that were appropriate for examining the attitude toward adopting knowledge management. Therefore, the combined research model employs the items that were used in the past research to measure "attitude" to reflect the construct of attitude toward knowledge management by revising them into the following statements: (i) adopting knowledge management is a good idea (Davis, Bagozzi & Warshaw 1989; Fishbein & Ajzen 1975; Taylor & Todd 1995a, 1995b; Venkatesh et al. 2003); (ii) adopting knowledge management makes work more interesting (Thompson, Higgins & Howell 1991); Venkatesh et al.

2003); (iii) knowledge management adoption is fun (Davis, Bagozzi & Warshaw 1992; Thompson Higgins & Howell 1991; Venkatesh et al. 2003); and (iv) I like adopting knowledge management (Compeau & Higgins 1995; Compeau et, Higgins & Huff 1999; Davis, Bagozzi & Warshaw 1989; Fishbein & Ajzen 1975; Todd 1995a, 1995b; Venkatesh et al. 2003).

6.5.4 Knowledge Management Practice

Gold, Malhotra and Segars (2001) suggest that knowledge processes along with knowledge infrastructure are the core capabilities that can facilitate successful knowledge management via enhancing the organizational effectiveness. The previous studied have identified several activities involved in the practice of knowledge management, including (i) knowledge acquisition: to capture, acquire and create knowledge (Chait 1999; Delong 1997; Gold, Malhotra & Segars 2001; Leonard 1995; Skyrme & Amidon 1998; Teece 1998); (ii) knowledge identification: to evaluate and cleanse knowledge (Chait 1999; Shin, Holden & Schmidt 2001); (iii) knowledge integration: to organize, combine and coordinate knowledge (Leonard 1995; Teece 1998); (iv) knowledge storage: to store up knowledge (Chait 1999) (Shin, Holden & Schmidt 2001); (v) knowledge distribution: knowledge transference and dissemination (Alavi & Leidner 2001; Delong 1997; Gold, Malhotra & Segars 2001; ; Shin, Holden & Schmidt 2001; Skyrme & Amidon 1998; Spender 1996); and (vi) knowledge application: to use and apply knowledge (Alavi & Leidner 2001; Delong 1997; Gold, Malhotra & Segars 2001; Shin, Holden & Schmidt 2001; Skyrme & Amidon 1998; Spender 1996)

There was a general agreement among all participants in the field study that gathering knowledge would be the first step in implementing knowledge management. The participant from company C indicated that the collected knowledge should be filtered to eliminate the knowledge that was quite irrelevant. The participants from companies B, C, E, E and F underlined that knowledge should be organized using appropriate classifications and then the knowledge can be found and accessed when needed. The participants from companies B, D, E and F mentioned that knowledge and experience sharing was one of the major activities involved in the practice of knowledge management. They argued that personal experience and knowledge were

particularly precious in the life insurance business since it deals with people's affairs, which were usually changeable and unpredictable. Different manners and techniques would be required in facing different customers and situations. The participants from companies B and E asserted that other's knowledge would be worthless for a person unless he or she absorbed the knowledge and transformed it into his or her individual knowledge and skills. Finally, the participants from companies B and E indicated that the ultimate stage of knowledge management was that knowledge management could be routinized and become a part of the ordinary operation.

6.5.5 Perceived Expected Performance

Gold, Malhotra and Segars (2001) indicate that a hallmark of the new economy is the ability of organizations to realize the economic value of well managing the assets associated with knowledge. Effective knowledge management can lead to better organizational performance in areas of competitive advantage, customer focus, innovation and lower costs (Skyrme & Amidon 1997).

Earl (2001) suggests that the promise for giving more attention to creating, providing, sharing and using knowledge is that organizational performance can thus be improved. However, little research has been able to quantify the benefits of knowledge management for organizations (Feng, Chen & Liou 2004). For example, the impact of adopting knowledge management system was found to be insignificant in reducing the production costs (Feng, Chen & Liou 2004). Chou (2001), using financial indicators, reported that knowledge management activities were not shown to have effect on organizational performance in the financial industry in Taiwan. Wang (2004) proposed that perceived organization performance could better demonstrate the worth of knowledge management because it was hard to transform the impact of knowledge management applications on organizational performance into the visible profits in financial performance indicators. Accordingly, this study proposes that the practice of knowledge management will turn into the enhancement of perceived performance for organizations.

In the field study, the participants generally agreed that knowledge management

processes would be shown to increase the perceived organizational performance, while not necessarily to have direct influence on the financial performance. The participants from company E expressed his concern that sometimes the managers could hardly see the payback from investing money and labor in conducting knowledge management activities. It was also indicated by the participant from company B that the financial performance of life insurance companies was largely affected by business, economic and environmental factors, e.g., history of the company, economic scale of the company and competition in the financial industries. From the interviewees' viewpoints, the benefits of applying knowledge management were barely seen in a short time. However, they believed that knowledge management would be perceived to increase the organizational performance after it was implemented for a period of time. It was essential that the life insurance business could recognize the value of knowledge management to grasp the opportunity to create long-term internal strengths. Therefore, this study attempts to look into what knowledge management would bring to the life insurance companies in terms of their perceived expected performance. Combining the literature and the findings of the field study, the improvement of organizational performance via knowledge management was suggested to be shown in the following aspects: (i) providing better services; (ii) enhancing overall operational efficiency; (iii) reducing cost, e.g., saving labor cost and consumption of paper; (iv) having capability to adapt to changes; (v) gaining better reputation and image for the organization; (vi) improving the competency of workers; (vii) providing managers with more precise and in-time information for decision making; (viii) retaining the worker's knowledge and experience in the organization; and (ix) reducing the impact and possible loss arising from employee turnover.

6.6 Summary

This chapter presented a comprehensive study to determine the factors and variables of knowledge management adoption and practice in the context of Taiwan life insurance industry. A qualitative field study was conducted initially. Six companies, which were varied in type, history and size, took part in this study, resulting in ten interviews with key persons working in the companies. The interviews were radio taped and the contents with field notes were transcribed and

rigorously reviewed by the researcher. Using the content analysis approach, 12 factors and 93 variables were identified and presented in the form of a list showing the companies revealing the variables. Followed is the presentation of the linkages among the factors. The individual models, representing the adoption and applications of knowledge management in each of the participating companies, were also provided.

The preliminary research model was combined with the findings of the field study to form the final research model. To generate the final research model that could be well operated among Taiwan life insurance enterprises, the original construct of "environments" were suggested to be supplemented by "industrial factors". "Information technology" was replaced by "information technology support" to better describe the role of IT in facilitating the management of knowledge in the life insurance companies in Taiwan. "Knowledge management promotion" was used to better define the construct that represent the relevant initiatives that were projected to promote knowledge management in the organization. The combined research model characterized a comprehensive set of factors that were believed to influence the adoption and practice of knowledge management in Taiwan life insurance industry. This model will be further examined via empirical surveys. The next chapter presents a description of the hypotheses and development of the survey instrument.

Chapter 7 HYPOTHESIS AND QUESTIONNAIRE DEVELOPMENT

7.1 Introduction

A detailed description of the development of research hypotheses and questionnaire, which reflect the final comprehensive model, is provided in this chapter. The final comprehensive model was proposed in Chapter 6 via combining the tentative research model and the results of the field study. This chapter first presents the hypothesized suggestions of this study. The section that follows describes the design of the research instrument and presents a table of the measurement items with their respective references. The processes of back translation and pretest are depicted next. Finally, the operation and results of the empirical pilot study are presented and the final questionnaire for the main survey is thus obtained.

7.2 Hypothesis Development

Based on the combined research model (see Figure 6-7) that incorporates the literature and field study, the following hypotheses are proposed and presented in Figure 7-1 via the research model.

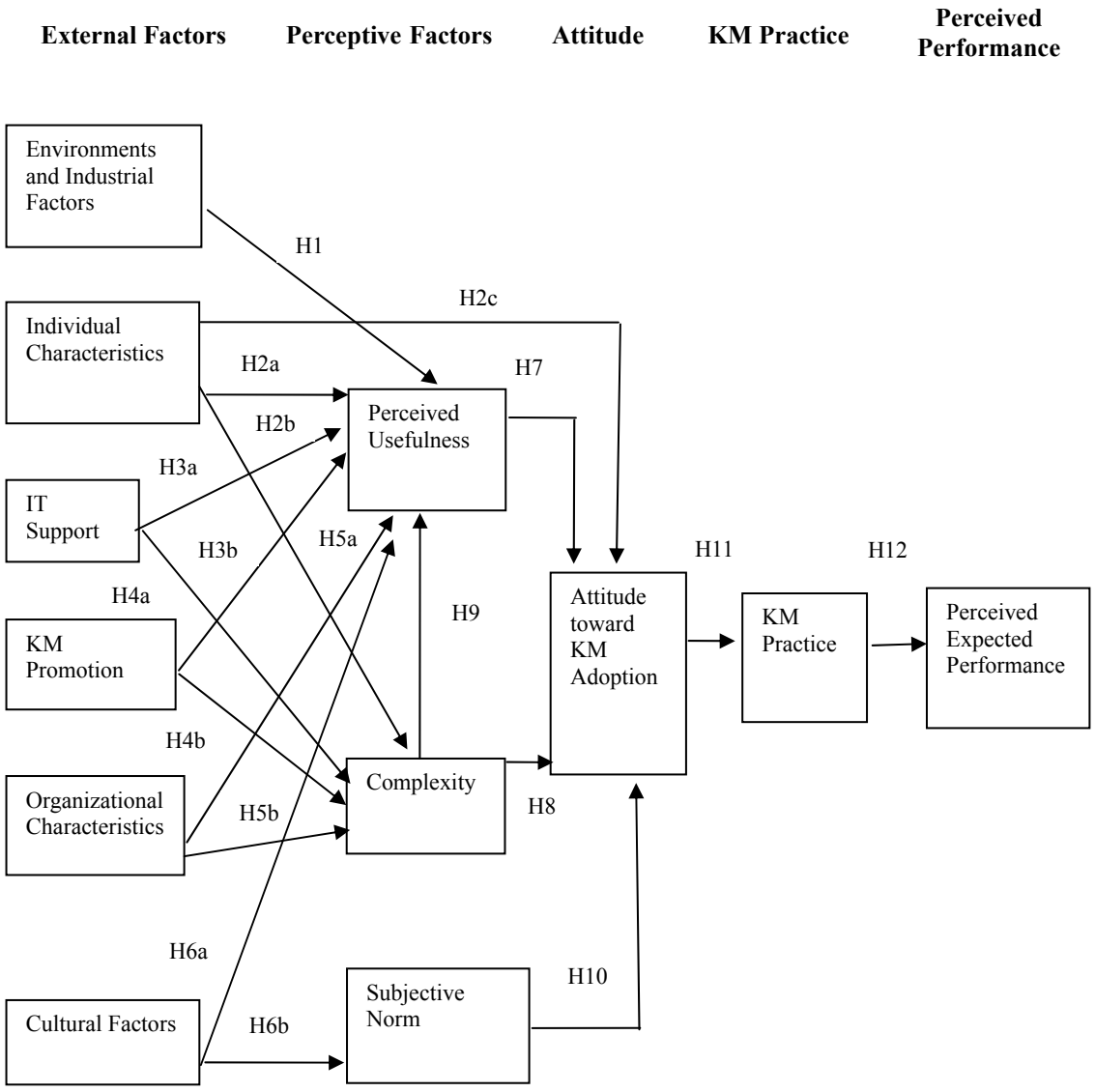

Figure 7-1 Research Model for Hypothesis Tests

7.2.1 Hypotheses Related to External Factors

7.2.1.1 Environments and Industrial Factors

External environmental changes and customer demands should be taken into consideration for life insurance enterprises in implementing knowledge management to sustain their competitive competency in the ever-changing environment (Hung,

Hui-Shu 2003).

Environments have been identified to have impacts on the adoption of innovations, such as Customer-based Inter-organizational System (Grover 1993), Flexible Manufacturing System (Belassi & Fadlalla 1998), personal computer usage (Lee 1998), Electronic Data Interchange (McGowan & Madey 1998) and knowledge management in organizations (Holsapple & Joshi 2000). Besides, Davis, Bagozzi and Warshaw's (1989) technology acceptance model indicated that external factors, e.g., environments and industrial factors, could influence actual system use via perceived usefulness and perceived ease of use.

The field study results provided more support that environments and industrial factors would positively influence employees in perceiving the usefulness that knowledge management can bring to them. It was recognized by most participants that the environmental changes and industrial characteristics, such as trend, rapid changes in rules and regulations, as well as customers' complains, stimulated them to adopt knowledge management and they believed that knowledge management could enhance their abilities in adapting to the external changes and reducing the complaints from customers. Therefore, based on the foregoing discussions, the hypothesis related to environments and industrial factors are proposed as follows:

H1: "Environments and Industrial Factors" positively influence the "Perceived Usefulness" of Knowledge Management.

7.2.1.2 Individual Characteristics

Based on Rogers's (1995) innovation-decision process, users' adoption plays an important role in putting knowledge management into place in an organization. Davenport (1996) stated in "ten principles of knowledge management" that effective management of knowledge required hybrid solutions of people and technology. While the artificial intelligence, such as human-like reasoning, had been claimed to be within reach, firms wising to well manage knowledge still needed a heavy does of human labor. Human beings were quite accomplished at certain knowledge skills, even though they might be more expensive and cantankerous (Davenport 1996).

It is indicated by Ajzen and Fishbein (1980) in the TRA that the demographic variables and personality traits could be the external factors that influence intentions and behaviors indirectly by their effects on behavioral beliefs, outcome evaluation, etc., or on the attitudinal and normative components. In examining the applications of Customer Relationship Management (CRM) System in a life insurance company, Lo (2003) observed that individual background variables, such as education and position, had significant influences on the user's satisfaction and performance of the system. Chang (2002) indicated that personality with internal locus of control, with which a person believed that he or she could control the results of his/her behavior and thus had more enthusiasm toward work, had positive impact on employees' satisfaction upon knowledge management. Moreover, using Technology Acceptance Model in analyzing the factors of employees' using electronic system in a life insurance company, Liu (2004) found that prior computer experience had positive effects on the perceived usefulness.

Furthermore, individual and user characteristics or differences have been identified as the important factors in influencing the adoption and diffusion of innovations, including personal computer utilization among knowledge workers (Al-Khaldi & Wallace 1999), new information technologies (Agarwal & Prasad 1999; Larsen & Wetherbe 1999), innovation in organizations (Rogers 1995), expert systems (Liker & Sindi 1997), software process innovations (Agarwal & Prasad 2000) and information technology for knowledge management (Gottschalk 1999).

The findings from the field study were in line with the literature. The interviewees expressed that individual characteristics, such as education, position, computer background, individual innovativeness, work attitude and personality, had positive influences on people's perceived benefits and value regarding knowledge management in the life insurance companies. As a result, the following hypothesis is suggested:

H2a: "Individual Characteristics" positively influence the "Perceived Usefulness" of Knowledge Management.

Rogers (1995) identifies individual characteristics as one of the independent variables which are related to innovation of organizations. For example, a person who is more innovative inherently would adopt an innovation earlier than others. According to Rogers (1995), complexity, i.e., the degree to which an innovation is perceived as difficult to understand and use, is an important determinant in innovation adoption and diffusion (Rogers 1995). For those innovators in an organization, they would be more willing to accept an innovation and thus the perceived complexity associated with the innovation would be diminished. Therefore, to examine knowledge management adoption and practice in life insurance organizations in this research, individual characteristics are suggested to negatively influence the perceived complexity in adopting and applying knowledge management.

Davis, Bagozzi & Warshaw's (1989) Technology Acceptance Model also proposes that ease of use (EOU) is determined by external variables, such as individual differences and system features. An extended TAM study of Igbaria, Guimaraes and Davis (1995) confirmed that user characteristics had significant direct impacts on perceived ease of use. It was further verified by Agarwal and Prasad (1999) that individual differences, including the role with regard to technology, tenure in workforce and level of education, had positive effects on perceived ease of use. As complexity is defined as the degree to which knowledge management adoption and practice is perceived as difficult to understand and use, which is the opposite facet of perceived ease of use, it can be inferred that individual characteristics, e.g., tenure and education, would have negative influences on the perceived complexity.

The results from the interviews were in line with the literature. There was an agreement among the interviews that, since knowledge management mostly involved accepting new ideas and applying information systems, individual characteristics, especially educational background, work attitude, computer experience and skills, as well as the habits of using computers and internets, had negative influences on the perceived complexity of knowledge management, which in turn would affect their attitude toward knowledge management adoption and knowledge management

practice. Hence, the hypothesis is posited as follows:

H2b: "Individual Characteristics" negatively influence the "Complexity" of Knowledge Management.

Ajzen and Fishbein (1980) states that external variables will be related to behavior only if they are related to one or more of the variables, namely attitude, subjective norm and intention, which are specified in the Theory of Reasoned Action. Though the classic TRA model did not link individual variables directly to the attitude toward the behavior, it was indicated that demographic variables (such as education and socioeconomic status), attitude toward targets (e.g., people and institutions) and personality traits (introversion-extraversion) could be the external factors that effect behavior through behavioral beliefs, subjective norm, intention or attitude.

However, there was a point of view arising from the interviews that a person's individual characteristics had direct impacts on his or her attitude toward knowledge management adoption. The interviewees emphasized that the individual characteristics, especially working attitude and loyalty to the organization, were very important and would directly influence his or her attitude toward adopting knowledge management. It was suggested that a person with active attitude to work had more enthusiasm at job and thus always had positive evaluation regarding knowledge management adoption. The discussions above result in the following hypothesis:

H2c: "Individual Characteristics" positively influence the "Attitude toward Knowledge Management Adoption".

7.2.1.3 Information Technology Support

While not all knowledge management projects involve an implementation of information system, a lot of knowledge management initiatives rely on information technology as a critical enabler which supports knowledge management in sundry ways (Alavi & Leidner 2001).

Based on Davis, Bagozzi and Warshaw's (1989) technology acceptance model,

information technology characteristics were found to be the significant external factors which had direct effects on perceived usefulness in influencing the adoption and diffusion of innovations in the past research, such as Flexible Manufacturing System (Belassi & Fadlalla 1998), information systems in small business (Thong 1999), office automation (Moore 1987), microcomputer usage (Igbaria, Guimaraes & Davis 1995), information technologies (Agarwal & Prasad 1997), open systems (Chau & Tam 1997), client-server technology (Chengalur-Smith & Duchessi 1999), corporate website (Beatty, Shim & Jones 2001), among many others.

Information systems have been identified to play a significant role in applying knowledge management in Taiwan life insurance industry (Yang 2004). Yang (2004)'s study showed that, in the two leading life insurance companies in Taiwan, the employees had highly recognized the effectiveness of information technology in conducting knowledge management activities, such as knowledge gathering, storing, systemizing, learning, analyzing, sharing and innovating. Liu (2004) reported that technology characteristics, via their effects on the task-technology fit, positively influenced the perceived usefulness.

During the field study, all participants agreed that information technology played an important role in the adoption and applications of knowledge management in their organizations. In line with the literature, the interviewees mentioned that success of knowledge management needed not only information technology, but also the execution and cooperation of employees. Nevertheless, it could not be overemphasized that information system and facilities could provide the employees with technical supports in gathering, organizing and retrieving knowledge rapidly and effectively. To be really useful for the employees, the support of information should have several features, including hardware and software infrastructure, correct and integrated information, compatibility, multi-function, updated data and information, testing before implementation, as well as good communication between information technicians and users.

As the discussions presented above, the hypothesis is suggested as follows:

H3a: "Information Technology Support" positively influences the "Perceived

Usefulness" of Knowledge Management.

Gold, Malhotra and Segars (2001) suggest that technology comprises a crucial element of the structural dimension required to mobilize social capital for creating new knowledge Originally fragmented flows of information and knowledge can be integrated through the linkage of information and communication systems in an organization. Information technologies, such as collaboration and distributed learning systems, allow individuals in different areas of within an organization to have interaction without the structural and geographical limits (Gold, Malhotra & Segars 2001).

The previous studies, such as Igbaria et al. (1997), as well as Igbaria, Guimaraes and Davis (1995), have shown that system characteristics and computing supporting would have direct impacts on perceived ease of use, which is opposite to "complexity" used in this research, in referring to the perceptions regarding how difficult or easy knowledge management is to understand and apply. Moreover, Chiu (2004) verified that system characteristics had positive influences on users' perceived ease of use. As described earlier, complexity is the opposite aspect of perceived ease of use. Therefore, it can be inferred that system characteristics would have negative influences on the perceived complexity.

During the interviews, there was a general agreement among the participants that information technology support, such as fast and stable platform, friendly-to-use system or software, compatibility with the practical operation and various functions, would decrease the difficulties in implementing knowledge management and thus influence the employee' opinions about knowledge management. It was stated that, if there was sufficient and in-time information technology support, several technical problems involved in knowledge management could be solved and then the employees would not feel that knowledge management was so hard as they had imagined. Based on the discussions above, the following hypothesis is thus proposed:

H3b: "Information Technology Support" negatively influences the "Complexity" of Knowledge Management.

7.2.1.4 Knowledge Management Promotion

Davenport (1996) pointed out that sharing and using knowledge were often unnatural acts. People would ask questions like that, "If my knowledge is a valuable resource, why should I share it?" To enter people's knowledge into a system and to seek the knowledge from others needs to be highly motivated, given that the natural tendency of human beings is to hoard their knowledge and look suspiciously upon that from others (Davenport 1996).

Previous studies, such as Alavi and Leidner (2001), Brand (1998), Chait (1999), Davenport (1996), Davenport and Glaser (2002), as well as Rogers (1995), have identified that the prior conditions and settings, such as knowledge mangers, knowledge management team, top management support, resources, as well as support of time and space, are essential in promoting knowledge management effectively and successfully. Besides, it was found (Lin 2001) in the China Steel Corporation that the knowledge management mechanisms had positive influences on the employees' job performance.

While the previous research has not used the construct of "knowledge management promotion" as the external factors which would influence perceived usefulness of knowledge management, all of the interviewees in the field argued that the companies should have some knowledge management promotion activities and schemes initially to create the environment in which the employees were motivated to adopt knowledge management. They suggested that the elements of promoting knowledge management, such as a knowledge management plan or project, support of human and financial resources, transmitting the mission of knowledge management, setting up the time schedule, reward, etc., would have positive impacts on the employees in perceiving the benefits of knowledge management for them.

Therefore, the hypothesis is proposed as follows:

H4a: "Knowledge Management Promotion" positively influences the "Perceived Usefulness" of Knowledge Management.

3M's experience emphasized that the "appropriate environment" had to be in place before people were motivated to access and share information and to convert that information into knowledge (Brand 1998). According to Brand (1998), for an innovation, such as knowledge management, to take place, a company should attempt to create an atmosphere in which the innovation could flourish, rather than just ordering people to share knowledge and be creative in turning ideas into practical products and services. This viewpoint coincided with the innovation-development process by Rogers (1995) addressing that an organization should research, develop, and commercialize an innovation while diffusing the innovation in the organization. Innovation, e.g., knowledge management in this research, in its early stages is a "loose" activity and can follow a chaotic path (Brand 1998). Therefore, there should be some promotion for employees to better understand the concept and scheme of knowledge management to reduce their perceived complexity regarding knowledge management.

Brand (1988) suggested that standard knowledge management approaches and processes would be vital to run the path of innovation smoothly. Before implementing knowledge management, organizations should established several mechanisms, such as directives (i.e. the specific set of rules, standards and procedures), task development and coordination patterns, interaction protocols and process specifications, as well as self-contained teams, in which specialty and people with prerequisite knowledge were formed for solving problems in situations of task uncertainty and complexity (Grant 1996).

During the field study, the participants, especially those from the companies which were in the initial stage of knowledge management, stressed that it was critical that the companies could inaugurate knowledge management by having a specific plan or project, in which related budgets and employees were well allocated and arranged. In addition, it was suggested that organizations should have some training for the employees to learn the skills required in applying knowledge management, and provide the support of time and space for employees to share their knowledge and experiences with others. The efforts of organizations to promote knowledge management could reduce its impacts and associated complexity among the

employees.

Accordingly, the following hypothesis is suggested:

H4b: "Knowledge Management Promotion" negatively influences the "Complexity" of Knowledge Management.

7.2.1.5 Organizational Characteristics

Gold, Malhotra and Segars (2001) identified structure, along with technology and culture as the key elements of knowledge infrastructure capabilities. It was advocated that organizational structure was important in leveraging technological architecture. Particularly, the structure of an organization should be designed for flexibility (as opposed to rigidity) so that it could encourage knowledge sharing and collaboration across boundaries within the organization (Gold, Malhotra & Segars (2001).

Rogers (1995) suggested that the organizational characteristics, such as size, structure and predetermined goals, would have influences on innovation in organizations. Previous research, such as Belassi and Fadlalla (1998), Grover (1993), Kim and Srivastava (1998), Sarvary (1999), Sultan and Chan (2000), Thong (1999), Thong and Yap (1995), as well as Yap, Soh and Raman (1992), have proposed that organizational factors have significant impact on the adoption and diffusion of innovation. In addition, Davis, Bagozzi and Warshaw (1989)'s technology acceptance model indicated that external variables, such as situational constrains and managerially controllable interventions, would have influences on perceived usefulness.

During the interviews, there was an agreement among the participants that organizational characteristics, such as size, structure, vision, objectives, as well as the system for duty rotation and acting duty, had positive influences on the perceived value of knowledge management, which in turn would affect the employees' attitudes toward adopting knowledge management and thus on the practice of knowledge management.

The foregoing discussions result in the following hypothesis:

H5a: "Organizational Characteristics" positively influence the "Perceived Usefulness" of Knowledge Management.

It was proposed by Rogers (1995) that organizational structure, such as centralization (the degree to which power and control in a system are concentrated in the hands of relatively few individuals), formalization (the degree to which an organization emphasizes following rules and procedures in the role performance of its members), interconnectedness (the degree to which the units in a social system are linked by interpersonal net work), and system openness (the degree to which the members of a system are linked to other individuals who are external to the system), had impacts on organizational innovativeness, which would influence the innovation diffusion in the organization. It was also suggested that large organizations would be more innovative as they would have more resources to adopt and apply an innovation (Rogers 1995).

Alavi and Leidner (1999) pointed out that, in the absence of an explicit strategy to better create and integrate knowledge in the organization, even computer systems which facilitated communication and information sharing had only a random effect at best. Yang (2004) stressed that the life insurance industry in Taiwan should have appropriate strategies to develop knowledge management frameworks which were suitable for the unique characteristics of different organizations. Besides, Lu (2002) showed that organizational factors, such as organizational learning, positively affected the satisfaction of using customer relationship management system. Yeh (2003) also suggested that learning structure had impacts on the promotion of electric learning system in the life insurance industry. From the arguments stated above, it is suggested that organizational characteristic, e.g., strategy and learning, would decrease the employees' perceived complexity pertaining to knowledge management.

There was also a view arising from the field study that, organizational characteristics, such as openness, policy and learning environments, could have negative impacts on people's perceiving the knowledge management difficult. Thus, according to the preceding discussions, the hypothesis is proposed as follow:

H5b: "Organizational Characteristics" negatively influence the "Complexity" of Knowledge Management.

7.2.1.6 Cultural Factors

Culture has been identified as a major catalyst, or alternatively a main hindrance, to knowledge creation and sharing (Alavi & Leidner 2001). On one hand, a knowledge-friendly organizational culture can be the important conditions that lead to the success of knowledge management initiatives (Davenport & Prusak 1998). On the other hand, the culture, in which knowledge hoarding is promoted and encouraged, will be the barriers to knowledge management (Alavi & Leidner 2001).

Previous studies, such as Barney (1986,1997), Brand (1998), Chait (1999), Chen, Shang-Shing (2003), Gold, Malhotra and Segars (2001), Hung, Hui-Shu (2003), Liou (2004), Nahapiet and Ghoshal (1998), as well as Rogers (1995), have identified culture as a key factor in the adoption and practice of knowledge management to create sustained competitive advantages.

Davenport and Prusak (1998) suggested knowledge management projects should have the aim to develop a knowledge-intensive culture, in which behaviors such as knowledge sharing and actively offering knowledge were inspired. Besides, teamwork was reported as the capabilities related to knowledge management needed in organizations (Brand 1998). According to Brand (1998), 3M's experience in knowledge management showed that, continuity of employment resulted in people helping others over and over again without immediate expectation of return. Some companies, concerning about long-term pension responsibilities, employed people on short-term contracts. Nonetheless, the short-term employees might not be interested in the sharing of knowledge for long-term innovative success since they knew that they would be leaving to work elsewhere (Brand 1998). Further, in accordance with Davis, Bagozzi and Warshaw (1989), the external variables, such as cultural factors, would have influences on knowledge management adoption and practice via perceived usefulness.

The field study results were in line with the literature. The participants indicated that cultural factors, e.g., knowledge-emphasis, team work, trust and commitment, as well as respect had positive impacts on the perceived usefulness of knowledge management, which in turn would influence the adoption and practice of knowledge management through the employees' attitude. The interviewees acknowledged that there should be the culture with an atmosphere that team work was appreciated, and people trusted one another, then it was possible to have the genuine adoption and practice of knowledge management in the organization. Thus following hypothesis is proposed:

H6a: "Cultural Factors" positively influence the "Perceived Usefulness" of Knowledge Management.

Rogers (1995) pointed out that cultural and religious norms could form the behavior patterns for the members of a social system and have influences on the diffusion of innovation. A firm's culture which was valuable, rare, and imperfectly imitable was identified as a source of sustained competitive advantage (Barney 1986). It was proposed (Barney 1997) that culture was socially complex so that it was costly or even beyond the ability of other firms to systematically manage and influence such resources and capabilities. Nevertheless, non-valuable socially complex resources and capabilities, such as the culture that prevented people from adopting new technologies in a timely and efficient manner, could create sustained competitive "disadvantages" (Barney 1997). Therefore, it is proposed in this study that cultural factors would affect people's perceptions regarding knowledge management via the subjective norm in the organization.

There was a general agreement among the interviews that cultural factors, such as knowledge-intensive culture, collective culture, trust and commitment and respective culture, would positively influence the subjective norms, which in turn would have impacts on a person's attitude to adopt knowledge management and thus affect the practice of knowledge management. The participants stated that the deeply-rooted cultures could shape the behavior mold by which the employees would be affected subconsciously, but greatly, in their adopting and applying knowledge management. Therefore, the hypothesis is posited as follows:

H6b: "Cultural Factors" positively influence the "Subjective Norm" of Knowledge Management.

7.2.2 Hypotheses Related to Perceptive Factors

7.2.2.1 Perceived Usefulness

A person's beliefs that the behavior leads to certain outcome and his or her evaluation of the outcome will have impact on the behavior by affecting his or her attitude toward the behavior (Ajzen & Fishbein 1980). The belief regarding the outcome for on a person is identified in TAM as the perceived usefulness, using a particular system would enhance a person's job performance, which is the significant factor in influencing the attitude toward using such a system, the intention to use and the actual system use (Davis, Bagozzi & Warshaw 1989).

The theory of Innovation Diffusion (ID) (Rogers 1995) indicates "relative advantages", the degree to which using an innovation is perceived as better than using its precursor, as the perceived characteristics of innovation that has influence on the innovation diffusion. According to Rogers (1995), the employees' perceptions of how well knowledge management will improve the existing ways of performing tasks will influence their attitude to adopt knowledge management, as well as the diffusion of knowledge management.

Past studies, such as Adams, Nelson and Todd (1992), Agarwal and Prasad (1997), Beatty, Shim and Jones (2001), Compeau and Higgins (1995), Compeau, Higgins and Huff (1999), Davis (1986, 1989, 1993), Davis, Bagozzi and Warshaw (1989, 1992), Gefen and Straub (2000), Igbaria (1994), Igbaria, Guimaraes and Davis (1995), Jackson, Chow and Leitch (1997), Moore and Benbasat (1991), Rogers (1995), Thompson, Higgins and Howell (1991, 1994), Venkatesh and Davis (2000), Venkatesh et al. (2003), among many others, have identified perceived usefulness as the chief determinant of innovation acceptance and diffusion. The empirical studies in Taiwan life insurance industry, such as Liu (2004) and Chiu (2004), also reported the impact of perceived usefulness on the actual use of new technologies. Liu (2004) suggested that perceived usefulness had positive impacts on the employees' behavior

in using a new system through their intention. It was also reported (Chiu 2004) that perceived usefulness had effects on the staff's attitudes toward Learning Management System, which influenced their use of such a system.

The field study findings were in line with the literature. All of the participants stressed that the perceived usefulness, such as improving work and service quality, increasing work quantity, saving time, making it more efficient and easier at work, providing more convenience and flexibility, meeting the needs of work, allowing to gather and integrate knowledge effectively, enhancing professional competency, reducing mistakes and duplicate work, making it easier to learn other's work experience, as well as increasing the chances of promotion and raise, would have positive impacts on the employees' attitudes toward knowledge management adoption.

The preceding discussions lead to the following hypothesis:

H7: "Perceived Usefulness" positively influences the "Attitude toward Knowledge Management Adoption".

7.2.2.2 Complexity

According to Rogers (1995), complexity, defined as the degree to which knowledge management is perceived as difficult to understand and apply, will have influence on the adoption and practice of knowledge management.

Wu, Hsin-Ning (2003) suggested that the primary obstacle in knowledge management implementation was that the employees were too busy to key in the abundant information and data, as well as transform their personal experiences into knowledge. It was also indicated that the lack of time for employees to conduct knowledge management activities, such as generating knowledge, sharing experiences with others, or teaching/mentoring new workers, could be the major barrier to knowledge management success (Alavi & Leidner 2001; Brown & Duguid 1998; Cranfield University 1998; Glazer 1998). Yang (2004) sustained that organizations should avoid any chaos or disorder in operation for the employees by

prior testing, and the knowledge management team, with its professional knowledge and associated skills, should respond to any enquiries and solve the problems rapidly. To make knowledge management applied smoothly, it was important to have the support of information system that allowed the employees to find and retrieve the information they needed in a short time (Yang 2004). Moreover, when knowledge management project involved the applications of information technology, whether the related systems were easy to learn and friendly to use would be a vital issue to make the project feasible (Robertson 2002).

Previous research, such as Adams, Nelson and Todd (1992), Agarwal and Prasad (1997, 1998a, 1998b, 1999), Davis (1986, 1989, 1993), Davis, Bagozzi and Warshaw (1989, 1992), Karahanna, Straub and Chervany (1999), Mathieson (1991), Moore and Benbasat (1991), Rogers (1995), Szajna (1996), Taylor and Todd (1995b), Thompson, Higgins and Howell (1991), Straub (1994), Subramanian (1994), Venkatesh and Davis (2000), as well as Venkatesh et al. (2003), have identified complexity/perceived ease of use as the important factor of the adoption and diffusion of innovation. Besides, Liu (2004) verified that perceived ease of use influenced the employees' intention to use a new system in the life insurance enterprise. Chiu (2004) proposed that perceived of use affect the employees in using an initially-adopted e-learning system through the individual's attitude toward the system and intention to use it.

During the field study, there was a general agreement among the interviewees that the complexity involved in knowledge management, such as the circumstances that the associated information system was not friendly to use, too much time was spent on searching for the useful knowledge, the message regarding knowledge management was not simple, clear and short enough, the problems were not solved immediately, it was hard to find the exact information or knowledge required, and it was difficult to operate in practice, would make the employees feel frustrated and exhausted in the processes of adopting and applying knowledge management. The participants pointed that almost all the life insurance companies had been trying to reduce their labor costs under the great pressure of competitive markets. Lots of employees who were still working in the life companies were undertaking the tasks

which had been shared by two to three persons. Therefore, if knowledge management brought to them more troubles than benefits, they would give up their efforts in accepting such a bothersome mechanism.

Based on the discussions presented above, the following hypothesis is proposed:

H8: "Complexity" negatively influences the "Attitude toward Knowledge Management Adoption".

It was suggested by Davenport and Glaser (2002) that the programs which were especially designed for knowledge sharing often failed for the reason that those schemes made it harder, rather than easier, for people to perform their tasks.

The direct impact of perceived ease of use on the perceived usefulness have been commonly reported in the previous research, such as Adams, Nelson and Todd (1992), Davis (1986, 1989, 1993), Davis, Bagozzi and Warshaw (1989, 1992), Igbaria, Guimaraes and Davis (1995), Igbaria et al. (1997), Szajna (1996), Venkatesh and Davis (2000), among many others. It was indicated that, the easier a system was to use, the less effort was required to perform a particular job tasks and then the more effort could be contribute to other tasks and result in better performance at job (Davis, Bagozzi & Warshaw 1989). The perceived ease of use was also proved to have positive effect on users' perceived usefulness toward the electronic system in a study of information technology diffusion in the life insurance company (Liu 2004).

To be useful, it should be easy to retrieve and capture knowledge (Alavi & Leidner 2001). Knowledge emerges and evolves over time and today's knowledge may become tomorrow's ignorance. As a result, creation of easy to use and easy to remember retrieval mechanisms is the important aspect of organizational knowledge management strategies. If the information needed cannot be found or are difficult and time consuming to acquire, it would cost employees their valuable time and thus they cannot effectively capture, integrated and use knowledge (Phillips Fox 1998).

During the field study, the participants, particularly those from the companies which were in the preliminary stage of knowledge management, highlighted that

complexity of a knowledge management project or system would have negative impacts on the perceived usefulness regarding knowledge management among the employees. They expressed that, only the knowledge management programs which were easy to understand and apply could possibly be beneficial for them. If they needed to spend a lot of time conducting the activities related to managing knowledge; that is, they would work over time to finish their original tasks, they would not think that knowledge management was useful or helpful for them.

As per the above discussions, the hypothesis is suggested as follows:

H9: "Complexity" negatively influences the "Perceived Usefulness".

7.2.2.3 Subjective Norm

Subjective norm is described as the social influence that may influence an individual's attitude toward knowledge management adoption through the belief that peers and important others think he or she should adopt and apply knowledge management (Ajzen & Fishbein 1980; Rogers 1995). Lucas and Spitler (1999), in a field study of broker workstation, showed that social norms and the job requirement were more significant in predicting technology usage than perceived usefulness and perceived ease of use.

Previous studies, e.g., Ajzen (1991), Ajzen and Fishbein (1980), Davis, Bagozzi and Warshaw (1989), Liker and Sindi (1997), Lucas and Spitler (1999), Mathieson (1991), Moore and Benbasat (1991), Rogers (1995), Taylor and Todd (1995a, 1995b), as well as Thompson, Higgins and Howell (1991), have identified that subjective norm has impacts on an individual's behavior, such as innovation adoption and diffusion. In the case of a large manufacturing company, Thompson, Higgins and Howell (1991), reported that social norm had effects on personal computer utilization. It was suggested by Dishaw and Strong (1999) that social norms played a more important role in an organizational background. This research examines the adoption and practice of knowledge management, which involve managing both individual and collective knowledge in the setting of an organization. Therefore, it is suggested that subjective norm have influences on the employee's attitude and

behavior in adopting and applying knowledge management.

During the interviews, all the participants agreed that the employees would be affected by others' thoughts and opinions while accepting and implementing knowledge management. The interviewees stated that the employees worked "closely" with other workers, because they were provided with very limited space in an office (for saving administration costs). As a result, it was common that the subjective norm, such as peer pressure, other colleagues' comments, supervisor's opinions, the encouragement from senior management, opinion leaders, would positively affect the workers' attitudes toward knowledge management adoption and their behaviors in conducting knowledge management activities.

The preceding discussions lead to the following hypothesis:

H10: "Subjective Norm" positively influences the "Attitude toward Knowledge Management Adoption".

7.2.3 Hypothesis Related to Attitude toward KM Adoption

Individuals' affect or liking for particular behaviors can, under some circumstances, exert a strong influence on their actions (Compeau & Higgins 1995). It is suggested that enjoyment, referring to the extent to which the activity of using the computer is perceived to be enjoyable in its own right, apart from any performance consequences, that may be anticipated (Carroll & Thomas 1988; Malone 1981a, 1981b), is a key factor underlying the acceptance of users (Carroll & Thomas 1988; Davis, Bagozzi & Warshaw 1992).

In the TRA, attitude toward the behavior, an individual's positive or negative evaluation of performing the behavior, has been indicated to have impact on the relationship between certain beliefs and the behavior (Ajzen & Fishbein 1980). Previous studies, such as Ajzen (1991), Moore and Benbasat (1991), Taylor and Todd (1995a, 1995b), as well as Thompson, Higgins and Howell (1991) have also examined an individual's liking, enjoyment, joy and pleasure that is identified to be associated with technology use (Venkatesh et al. 2003). Accordingly, the attitude

toward knowledge management adoption in this study is defined as an individual's overall affective reaction to knowledge management adoption.

The significant role of attitude in predicting a person's behavior has been identified in the past research, such as Ajzen (1991), Ajzen and Fishbein (1970, 1975, 1980), Bandura (1986), Carroll and Thomas (1988), Davis (1993), Davis, Bagozzi and Warshaw (1992), as well as Engel, Blackwell and Miniard (1986). Given the theoretical support, it is thus expected in this research that those employees with a positive attitude toward adopting knowledge management will be more active in conducting the associated activities in the practice of knowledge management.

The field study findings were in line with the literature. There was an agreement among the interviewees that employee's attitudes would influence their behaviors in the practice of knowledge management. Many of the participants in the field study underlined the importance of an individual's attitude by stating that, "Attitude decides everything." They explained that, as more and more people stressed individualism in the modern world, they would do whatever they liked. Meanwhile, they would refuse to accept what they hated or felt unpleasant for.

Therefore, the following hypothesis is posited:

H11: "Attitude toward Knowledge Management Adoption" positively influences the "Knowledge Management Practice".

7.2.4 Hypothesis Related to Knowledge Management Practice and Perceived Expected Performance

It was reported (Wu, Chi-Min 2003) that Knowledge management could enhance the core competence of an organization and thus improve the organizational performance. It was also suggested that knowledge management processes had impacts on organizational effectiveness (Gold, Malhotra & Segars 2001).

Previous research, such as Davis and Mentzer (2002), Gold, Malhotra and Segars (2001), Hasan and Al-Hawari (2003), Huang (2002), Hung, Mao-Sheng (2003),

Kalling (2003), Lin (2001), Massey, Montoya-Weiss and O'Driscoll (2002), Su (2002), Thomas and Keithley (2002), Wang (2004), Wang, Tsai-Pai (2002), Wu, Chi-Min (2003), Wu, Chia-Chun (2004) and Wu, Hsin-Ning (2003), have identified that the practice of knowledge management, such as knowledge management processes, strategies and activities, had influences on the performance of an organization. In an empirical study in Taiwan, Wu, Chi-Min (2003) suggested that knowledge management had effects on the organizational core competence which resulted in the improvement of organizational performance in four aspects: finance, customer, internal operation, as well as learning and growth. It was proposed, in an investigation conducted among the top 1000 manufacturers in Taiwan, that knowledge management had impacts on the organizational knowledge performance, including the improvement of knowledge depth, knowledge availability, knowledge growth, knowledge diffusion, knowledge variety, knowledge integration, knowledge transformation, and innovation of knowledge. Further, Wang (2004) examined the relationships between knowledge management and business performance among the commercial banks in Taiwan and found that knowledge management had impacts on the organizational performance of the banks.

Chou (2001), in exploring the relations between knowledge management activities and management performance on major corporations in Taiwan, reported that most of the corporations had put efforts in developing knowledge management. However, knowledge management was not found to result in significant improvement in the organizational performance for financial industries. The reasons for such findings could be that knowledge management had only been applied in the financial corporations in a few years, and the benefits of knowledge management could not be revealed in the organizational performance by using financial indicators (Chou 2001). As a result, Chou (2001) suggested that future research should use other performance indicators, such as organizational efficiency, to examine the value of knowledge management for organizations. In the meanwhile, Gold, Malhotra and Segars (2001) pointed that capturing the contribution of knowledge management in terms of financial indicators, such as return on investment (ROI) and return on equity (ROE), might be significantly confounded by many uncontrollable business, economic and environment factors. Other contributions of performance, such as organizational

effectiveness, could better provide insights into the value-added aspects of knowledge management (Gold, Malhotra & Segars 2001).

During the field study, there was a general agreement among the participants that the practice of knowledge management would result in the enhancement of organizational performance in several aspects, such as customer service, operational efficiency, cost down, ability to adapt to changes, reputation of the organization, quality and knowledge of the employees, information for decision makers, keeping worker's experience in the company, and decreasing the impact of turnover. However, many interviews acknowledged that, if only looking at the financial performance, they would not have seen the significant influences of applying knowledge management for their organizations. The participants ascertained that knowledge management was believed to improve their organizational performance in terms of better customer service quality and operational efficiency, which were imperative for the life insurance companies in Taiwan to increase or sustain their competences in the extremely competitive market.

Based on the foregoing discussions, the hypothesis is proposed as follows:

H12: "Knowledge Management Practice" positively influences the "Perceived Expected Performance" of Knowledge Management.

7.3 Instrument Development

The survey instrument was designed to contain three main parts: opening, middle and ending components (Neuman 2000). The opening part provided the respondents with the survey instructions, such as the aims of the research project, the nature of involvement of participants, as well as respect and protection for all responses. The middle part was composed of the instrument items that were measured on a seven-point (1-7) Liker scales, in which 1 indicated "strongly agree" and 7 indicated "strongly disagree" respectively. The respondents were requested to provide demographic information in the last part of the questionnaire. As suggested by Neuman (2000), the questions in the instrument were arranged in such a sequence so as to minimize the discomfort and confusion of respondents. Besides, precise

wording and straight-forward questions were used in the questionnaire to capture valid responses. Definitions of the key terms and some examples for certain items were provided for the respondents to easily understand the questions and reply with their genuine viewpoints. A copy of the full questionnaire can be found in Appendix F.

The questionnaire was developed based on the combined research model, of which the factors and variables were described in detail in Chapter 6. The measure items were extracted from the literature (as presented in Chapter 4.3) and the findings of the field study (described in Chapter 6.4.2). The measurements for each construct and their sources are summarized and presented from Table 7-1 to Table 7-12.

Table 7-1 Measurements of Environments and Industrial Factors

Item		Measurement	Source		References
EI1	Industrial competition	High competition in the life insurance industry.	Industrial competition	Literature	(Belassi & Fadlalla 1998) (Chen, Shih-Wen 2003) (Grover 1993) (Holsapple & Joshi 2000)
			Industrial competition	Field study	Company A, C, F
EI2	Trend	Trend of time and recent emphasis on KM.	External environmental changes	Literature	(Holsapple & Joshi 2000) (Hung, Hui-Shu 2003)
			Trend	Field study	Company A,C,D, F
EI3	Rules and	Strict	Rules and	Literature	(Chien 2003)

	regulations	regulations of the government upon the life insurance industry.	regulations		(Holsapple & Joshi 2000)
			Rules and regulations	Field study	Company A
EI4	Customer complains and disputes	Increasing numbers of customer complains and disputes.	Customer demand	Literature	(Chen, Shih-Wen 2003) (Grover 1993) (Hung, Hui-Shu 2003)
			Customer complains and disputes	Field study	Company A
EI5	High development of IT	Prosperity of IT industry in Taiwan.	High Development of IT	Field study	Company D
EI6	Use of a great amount of paper	Too many documents involved and a mass amount of paper used in the life insurance industry.	Use of a great amount of paper	Field study	Company D

Table 7-2 Measurements of Individual Characteristics

Item		Measurement	Source		References
IN1	Educational background	Educational background.	Education	Literature	(Ajzen & Fishbein 1980) (Lo

					2003)
			Educational background	Field study	Company B,C,D,F
IN2	Position	Position.	Position	Literature	(Lo2003)
				Field study	Company A,B,C,D
IN3	Work domain	Work domain, e.g., routine administrative work and intensively professional work.	Work domain	Field study	Company A,F
IN4	Computer background and skill	Computer background and skill.	Computer skill and experience	Literature	(Liu 2004)
			Computer background and skill	Field study	Computer A,B,C,D
IN5	Individual innovative-ness	Individual innovativeness (willingness to make and accept changes).	Innovativeness	Literature	(Rogers 1995)
			Individual Innovativeness	Field study	Company A,B,C,E
IN6	Work attitude	Attitude at work	Work attitude	Field study	Company A,B,C,E,F
IN7	Personality	Personality, e.g., passiveness and activeness; enthusiasm and conservativeness .	Personality	Literature	(Ajzen & Fishbein 1980) (Chang 2002)
				Field study	Company A,B,E,F
IN8	Habit of	Habit of using	Habit of using	Field	Company

	using computers and internet	computers and internet, e.g., average time used on computers and internet.	computers and internet	study	C,D
IN9	Loyalty and belonging to the company	Loyalty and sense of belonging in the company	Loyalty and sense of belonging in the company	Field study	Company A, F

Table 7-3 Measurements of Information Technology Support

Item		Measurement	Source		References
IT1	Hardware infrastructure	Hardware infrastructure, e.g., sufficient server capacity and bandwidth, as well as advanced equipment to provide speedy and stable platform.	Technology infrastructure	Literature	(Alavi & Leidner 1999) (Gold, Malhotra & Segars 2001) (Liou 2004)
			Hardware infrastructure	Field study	Company A,B,C,D,E,F
IT2	Software infrastructure	Software infrastructure, e.g., well-planned system and friendly-to-use software.	System characteristics	Literature	(Lo 2003)
			Software infrastructure	Field study	Company A,B,C,D,E,F
IT3	Correct and	Correct and	Correct and	Literature	(Alavi &

	integrated information	integrated information.	integrated information		Leidner 1999)
				Field study	Company A,C, D, F
IT4	Compatibility	Compatibility with the practical operation.	Compatibility	Literature	(Rogers 1995) (Thong 1999) (Agarwal & Prasad 1997)
				Field study	Company A,B,C
IT5	Function	Providing various functions according to the needs.	Function	Literature	(Alavi & Leidner 1999) (Chiu 2004)
				Field study	Company A, D,E,F
IT6	Data updating and maintenance	Data updating and maintenance.	Adaptation to changes	Literature	(Alavi & Leidner 1999)
			Data updating and maintenance	Field study	Company D,F
IT7	Testing and adjustment	Testing followed by proper adjustments.	Trialability	Literature	(Rogers 1995) (Agarwal & Prasad 1997)
			Testing and adjustment	Field study	Company D,E,F
IT8	Security of data and system	Security of data and system.	Security of data on internet and	Literature	(Alavi & Leidner 1999)

			information protection		
			Security of data and system	Field study	Company A,C,D
IT9	Cooperation and communica-tion	Cooperation and communica-tion between the IT persons and the users.	Cooperation and communica-tion	Field study	Company C,D,E,F
IT10	Funny and interesting design	Funny and interesting design, e.g., games.	Funny and interesting design	Field study	Company C,D

Table 7-4 Measurements of Knowledge Management Promotion

Item		Measurement	Source		References
KM1	KM manager	KM manager, e.g., CKO.	KM managers	Literature	(Chait 1999) (Davenport 1996)
				Field study	Company A,B,C,D,E,F
KM2	KM plan or project	KM plan or project, including the budget and relevant worker distribution.	KM plan or project	Field study	Company C,D,E,F
KM3	KM team	KM team.	KM team	Literature	(Alavi & Leidner 2001)

				Field study	Company B,C,D,E,F
KM4	Top management support	Top management support for KM.	Top manage-ment support	Literature	(Brand 1998) (Davenport & Glaser 2002)
				Field study	Company A,B,C,D,E,F
KM5	Human and financial support	Human and financial support.	Total resources	Literature	(Rogers 1995)
			Human and financial support	Field study	Company A,B,F
KM6	Transmission of the KM mission	Transmitting the mission and benefits of knowledge management.	Transmissi on of the KM mission	Field study	
KM7	Time schedule and guidelines	Time schedule and guidelines	Guidelines and directions	Literature	(Alavi & Leidner 2001) (Chait 1999)
			Time schedule and guidelines	Field study	Company A,B,E,F
KM8	Training	Training, introducing the concept of knowledge management and providing the basic skill	Training	Field study	Company C,E

		needed.			
KM9	Participation of the department representa-tives	The department representatives can participate in the KM meetings, to have good opportunities of expression and communication.	Participa-tion	Literature	(Hung, Mao-Sheng 2003) (Liou 2004)
			Participatio n of the department representa-tives	Field study	Company B,D,E,F
KM10	Support of time and space	Support of time and space, e.g., reducing the ordinary jobs of the employees who take part in promoting knowledge management.	Support of time and space	Literature	(Alavi & Leidner 2001)
				Field study	Company A,C,E
KM11	Knowledge transfer channel	Knowledge transfer channel, e.g., interpersonal and mass-media approach.	Knowledge transfer channel	Literature	(Alavi & Leidner 2001) (Wang, Chia-Hung 2002)
				Field study	Company A,B,C
KM12	Knowledge type	Knowledge type, e.g., explicit knowledge (documents) and tacit knowledge (personal	Knowledge type	Literature	(Alavi & Leidner 2001) (Wang, Chia-Hung 2002)

		experience).		Field study	Company C,E,F
KM13	Reward for KM	Reward for KM, including monetary and spiritual encouragement, e.g., bonus, medal and promotion.	Compensation policies and reward systems	Literature	(Barney 1997) (Davenport 1996)
			Reward for KM	Field study	Company C,E,F
KM14	KM performance evaluation	Evaluation on KM performance, e.g., competition and ranking.	Perform-ance evaluation	Literature	(Alavi & Leidner 1999) (Rogers 1995)
			KM perform-ance evaluation	Field study	Company A,B,D

Table 7-5 Measurements of Organizational Characteristics

Item		Measurement	Source		References
OR1	Size	Size of organization.	Size	Literature	(Alavi & Leidner 1999) (Rogers 1995) (Yeh 2003)
				Field study	Company A,C,E
OR2	Structure	Structure of	Structure	Literature	(Barney

		organization, no. of hierarchy, centralization and decentralization			1997) (Gold, Malhotra & Segars 2001) (Rogers 1995)
				Field study	Company C,F
OR3	Vision, value and objective	Vision, value and objective of organization.	Vision, value and objective	Literature	(Chait 1999) (Rogers 1995)
				Field study	Company A,B,C,D,E, F
OR4	Strategy and policy	Strategy and policy of organization.	Strategy	Literature	(Alavi & Leidner 1999) (Yang 2004)
			Strategy and policy	Field study	Company A,B,C,D,E
OR5	Organizational learning	Organizational learning system and environments.	Organiza-tional learning	Literature	(Alavi & Leidner 1999) (Lu 2002)
				Field study	Company A,B,C
OR6	The system for duty rotation and acting duty	The system for duty rotation and acting duty	The system for duty rotation	Field study	Company A,D,F

			and acting duty		
OR7	Employee turnover rate	Employee turnover rate.	Employee turnover rate	Field study	Company C,E
OR8	History of organization	History of organization, e.g., new entrant and existing company.	History of organiza-tion	Field study	Company C
OR9	Variety of product	Type and number of the marketed products of the company	Variety of product	Field study	Company C

Table 7-6 Measurements of Cultural Factors

Item		Measurement	Source		References
CU1	Knowledge-Intensive culture	Knowledge -intensive culture, in which seeking, offering and sharing knowledge is encouraged.	Knowledge -intensive culture	Literature	(Alavi & Leidner 2001)
				Field study	Company A,B,D,F
CU2	Team-work culture	Team-work culture in which the harmony and function of team work is	Team-work/ collective culture	Literature	(Alavi & Leidner 1999)
			Team-work culture	Field study	Company A,C,E,F

		emphasized.			
CU3	Trust and commitment	Culture of trust and commitment in which the relationship of trust and commitment is valued.	Trust and commitment	Literature	(Brand 1998) (Hung, Hui-Shu 2003) (Liou 2004)
				Field study	Company A,C,D,E,F
CU4	Respect	Respective culture in which employees and customers can feel respected.	Respect	Field study	Company C,D,E,F
CU5	Encouragement of exploration	Employees are encouraged to explore and experiment.	Encourage-ment of exploration	Literature	(Gold, Malhotra & Segars 2001)
CU6	Encouragement of asking for help	Employees are encouraged to ask others for assistance when needed.	Encourage-ment of asking for help	Literature	(Gold, Malhotra & Segars 2001)
CU7	Encouragement of interaction with others	Employees are encouraged to interact with other groups.	Encourage-ment of interaction with others	Literature	(Gold, Malhotra & Segars 2001)

Table 7-7 Measurements of Perceived Usefulness

Item		Measurement	Source		References
PU1	Work and service quality	Improve my work and service quality.	Work quality	Literature	(Compeau & Higgins 1995, 1999) (Davis 1993) (Moore & Benbasat 1991) (Thompson, Higgins & Howell 1991)
			Work and service quality	Field study	Company A,B
PU2	Work quantity	Increase my work quantity.	Productivity	Literature	(Davis 1989, 1993) (Davis, Bagozzi & Warshaw 1989,1992) (Moore & Benbasat 1991) (Venkatesh & Davis 2000)
			Work quantity	Field study	Company A,B
PU3	Time saving	Save my time at work.	Time reduction	Literature	(Davis 1989) (Davis, Bagozzi & Warshaw 1989) (Moore & Benbasat 1991) (Venkatesh & Davis 2000) (Thompson,

					Higgins & Howell 1991) (Compeau & Higgins 1995, 1999)
			Time saving	Field study	Company A,B,C,D,E,F
PU4	Efficiency	Make it efficient at work.	Efficiency	Field study	Company A,B,C
PU5	Making it easier to work	Make it easier to do the job.	Easier to do the job	Literature	(Davis 1989, 1993) (Davis, Bagozzi & Warshaw 1989) (Moore & Benbasat 1991)
			Making it easier to work	Field study	Company A,C
PU6	Convenience and flexibility	Allow more convenience and flexibility at work, e.g., information can be obtained at any time.	Convenience and flexibility	Field study	Company A,C,D,E,F
PU7	Meeting the needs at work	Meet the needs at work and solve the problems.	Usefulness	Literature	(Davis 1989, 1993) (Venkatesh & Davis 2000)
			Meeting the	Field	Company A,F

			needs at work	study	
PU8	Effective-ness	Increase the effectiveness in my saving, gathering and organizing data, as well as transferring my experience to others.	Effective-ness	Literature	(Compeau & Higgins 1995, 1999) (Davis 1989, 1993) (Davis, Bagozzi & Warshaw 1989, 1992) (Moore & Benbasat 1991) (Thompson, Higgins & Howell 1991)
				Field study	Company C,D
PU9	Professional competency	Enhance my professional abilities.	Perceived competency	Literature	(Compeau & Higgins 1995, 1999)
			Professional competency	Field study	Company A,B,E,F
PU10	Reducing the mistakes	Reduce the mistakes that could possibly be made at work.	Reducing the mistakes	Field study	Company D
PU11	Reducing the duplicate work	Decrease the duplicate work which is unnecessary.	Reducing the duplicate work	Field study	Company B
PU12	Making it easier to learn	Let me learn something that is hard to get	Making it easier to learn	Field study	Company D, E

		from books, e.g., others' experience in recent cases.			
PU13	Promotion/ Raise	Increase the chances of obtaining a promotion or getting a raise.	Promotion/ Raise	Literature	(Compeau & Higgins 1995) (Compeau & Higgins 1995, 1999) (Venkatesh & Davis 2000)

Table 7-8 Measurements of Complexity

Item		Measurement	Source		References
CM1	Not friendly to use	The associated information system is not friendly to use.	Difficult to use	Literature	(Davis 1993) (Rogers 1995) (Thompson , Higgins & Howell 1991)
			Not friendly to use	Field study	Company D,E,F
CM2	Taking too much time	It takes too much time to find the information needed.	Taking too much time	Literature	(Thompson , Higgins & Howell 1991)
				Field study	Company D,E,F
CM3	Not simple, clear and	The message is not simple,	Frustrating, inflexible and	Literature	(Davis 1993)

	short enough	clear and short enough.	tiring in interaction		
			Not simple, clear and short enough	Field study	Company A,B,F
CM4	No assistance in time	There is no immediate assistance when the problems occur.	No assistance in time	Field study	Company A,F
CM5	Lack of accessibility	The exact information or knowledge needed is not accessible.	Lack of accessibility	Field study	Company D,E,F
CM6	Not easy in the practical operation	It is not easy to operate in practice.	Not easy in the practical operation	Field study	Company A,B,F

Table 7-9 Measurements of Subjective Norm

Item		Measurement	Source		References
SN1	Peer pressure	Pressure from the peer of the company and the industry that they think I should adopt and apply knowledge management.	People who are important to me	Literature	(Ajzen 1991) (Fishbein & Ajzen 1975) (Ajzen & Fishbein 1980) (Davis, Bagozzi & Warshaw 1989) (Taylor & Todd 1995a, 1995b)

					(Mathieson 1991) (Venkatesh & Davis 2000)
			Peer pressure	Field study	Company A,D,F
SN2	Co-workers' adoption and comments	No. of co-workers who adopt and apply knowledge management and their comments.	Coworkers' usage	Literature	(Thompson, Higgins & Howell 1991)
			Co-workers' adoption and comments	Field study	Company C
SN3	Supervisor	Supervisor's attitude and opinion.	Supervisor	Literature	(Thompson, Higgins & Howell 1991)
				Field study	
SN4	Senior management	Encourage-ment of senior management.	Senior management	Literature	(Thompson, Higgins & Howell 1991) (Venkatesh & Davis 2000)
				Field study	Company C
SN5	Opinion leader	Influence of opinion leaders in the group.	Opinion leader	Literature	(Rogers 1995)
				Field study	Company F
SN6	Requirement of company	The company requires clearly that employees should accept and apply knowledge	Organization	Literature	(Thompson, Higgins & Howell 1991) (Venkatesh & Davis 2000)

		management.	Requirement of company	Field study	Company A,B,E
SN7	Prestige/ profile/status	Adopting and applying knowledge management can enhance a person's prestige, profile or status in the company.	Prestige/ profile/status	Literature	(Moore & Benbasat 1991)

Table 7-10 Measurements of Attitude toward KM Adoption

Item		Measurement	Source		References
AT1	A good idea	Adopting knowledge management is a good idea.	A good idea	Literature	(Davis, Bagozzi & Warshaw 1989) (Fishbein & Ajzen 1975) (Taylor and Todd 1995a, 1995b) (Venkatesh & Davis 2000)
AT2	Interesting	Adopting knowledge management makes work more interesting	Interesting	Literature	(Thompson, Higgins & Howell 1991) (Venkatesh & Davis 2000)
AT3	Fun	Knowledge management adoption is fun	Fun	Literature	(Davis, Bagozzi & Warshaw 1992) (Thompson, Higgins & Howell 1991) (Venkatesh

					& Davis 2000)
AT4	Likes	I like adopting knowledge management	Likes	Literature	(Compeau & Higgins 1995) (Compeau, Higgins & Huff 1999) (Davis, Bagozzi & Warshaw 1989) (Fishbein & Ajzen 1975) (Taylor and Todd 1995a,1995b) (Venkatesh & Davis 2000)

Table 7-11 Measurements of Knowledge Management Practice

Item		Measurement	Source		References
KP1	Gathering knowledge	We gather knowledge from different sources.	Knowledge acquisition	Literature	(Chait 1999) (Delong 1997) (Gold, Malhotra & Segars 2001) (Leonard 1995) (Skyrme & Amidon 1998) (Teece 1998)
			Gathering knowledge	Field study	Company A,B,C,D,E,F
KP2	Identifying Knowledge	We identify the knowledge that is	Knowledge identifica-tion	Literature	(Chait 1999) (Shin, Holden & Schmidt

		important and useful.			2001)
			Identifying Knowledge	Field study	Company C
KP3	Organizing knowledge	We organize knowledge by classifying and integrating the gathered knowledge.	Knowledge integration	Literature	(Gold, Malhotra & Segars 2001) (Leonard 1995) (Teece 1998)
			Organizing knowledge	Field study	Company B,C,D,E,F
KP4	Sharing knowledge	We share knowledge to others.	Knowledge distribution	Literature	(Alavi & Leidner 2001) (Delong 1997) (Gold, Malhotra & Segars 2001) (Shin, Holden & Schmidt 2001) (Skyrme & Amidon 1998) (Spender 1996)
			Sharing knowledge	Field study	Company B,D,E,F
KP5	Converting knowledge	We absorb and convert others' knowledge into our personal knowledge and skills.	Converting knowledge	Field study	Company B,E

KP6	Using knowledge	We apply knowledge in the practical work.	Knowledge application	Literature	(Alavi & Leidner 2001) (Delong 1997) (Shin, Holden & Schmidt 2001) (Skyrme & Amidon 1998) (Spender 1996)
			Using knowledge	Field study	Company B,E
KP7	Having KM a part of ordinary jobs	Knowledge management becomes a part of ordinary jobs.	Routinizing	Literature	(Rogers 1995)
			Having KM a part of ordinary jobs	Field study	Company D,F

Table 7-12 Measurements of Perceived Expected Performance

Item		Measurement	Source		References
PEP1	Customer service	Improving customer service by providing rapid and correct reply.	Customer satisfaction	Literature	(Alavi & Leidner 1999) (Delaney & Huselid 1996) (Liou 2004)
			Customer service	Field study	Company A,C,E,F
PEP2	Overall operational efficiency	Enhancing the efficiency in operation.	Overall operational efficiency	Literature	(Alavi & Leidner 1999) (Li & Atuahene-

					Gima 2001) (Liou 2004) (Kotabe, Martin & Domoto 2003)
				Field study	Company A,B,C,D,E
PEP3	Cost down	Reducing cost, e.g., saving use of labor, paper and space.	Cost down	Literature	(Alavi & Leidner 1999)
				Field study	Company B,C,,D,E,F
PEP4	Ability to adapt to changes	Having better ability to adapt to changes.	Ability to innovate	Literature	(Delaney & Huselid 1996) (Gold, Malhotra & Segars 2001)
			Ability to adapt to changes	Field study	Company A
PEP5	Reputation and public praise	Gaining better reputation and public praise.	Reputation and public praise	Field study	Company C,E
PEP6	Improving workers' quality	Improving the quality of workers.	Improving workers' quality	Field study	Company C
PEP7	Providing information for decision makers	Providing managers with more information in making decision.	Providing information for decision makers	Field study	Company D

PEP8	Keeping the record of workers' experience in the company	Keeping the employees' work experience and knowledge in the company.	Keeping the record of workers' experience in the company	Field study	Company C,D
PEP9	Decreasing the impact of turnover	Decreasing the impact and possible loss arising from employee turnover.	Decreasing the impact of turnover	Field study	Company D,F

7.4 Back Translation and Pretest

This research followed Brislin's (1993) decentering procedure by using back translation to maintain the translation equivalence. According to Brislin (1993), concepts that survived from back-translation process were considered as *etic* items, while those that were not translated well or lost were deemed as *emic* aspects. In this study, two bilinguals proficient in both English and Chinese were involved in the back translation processes. Firstly, the questionnaire was translated from English into Chinese by the researcher. In this step, the goal was to obtain a smooth and native Chinese version for the question and thus *emic* words and concepts were matched with the closest notions in Chinese which were used in Taiwan. Secondly, the Chinese questionnaire was examined and translated back to English by a recognized bilingual who was a native English speaker and familiar with Chinese. With careful examination of *emics* and some amendments were made in the procedure, the translation was finally considered to be fair.

The tentative research instrument was then pre-tested to detect any potential problems, e.g., question ambiguity and scales format. Three knowledge workers in the life insurance sector in Taiwan were invited to participate in the pretest. In the stage of pretest, telephone and e-mail interviews were incorporated. The drafts of research instrument were sent via e-mail attachments to the participants firstly and

they were given a week or more to read and examine the drafts to provide suggestions. Then, unstructured telephone interviews were conducted to obtain the feedbacks regarding the research instruments from the participants (Alreck & Settle 1995; Straub 1989). The use of telephone interview was adopted because the participants were in Taiwan while the researcher was in Australia. During the interview process, taking 20 to 30 minutes for each participant, the researcher verbally addressed the questions and noted the reply from the participants. After the phone interviews, two participants further e-mailed their opinions to the researcher to help organize the pretest feedback.

In general, the feedbacks received from the pretest indicated that the research instrument was easy to understand and no significant difficulties were found in answering the questionnaire. Nonetheless, useful suggestions and criticisms were obtained to improve the research instrument. For instance, to make the questionnaire more comprehensible to the respondents, the definition of knowledge management was revised as the process of "gathering, organizing and using individual and collective knowledge…", instead of the process of "identifying, managing and leveraging individual and collective knowledge…". The criticism regarding the layout of the questionnaire was used by adding highlights before the questions. Finally, the questionnaire was refined based on the pretest feedbacks and the revised questionnaire would be validated once again in the following pilot study.

7.5 Empirical Pilot Study

An empirical pilot study was undertaken to detect any errors, oversights and problems in design and instrumentation of the revised questionnaire (Cooper & Emory 1995). According to Straub (1989), the pilot study provided technical validation by serving as a dry run before the real main survey. The suggested size of a pilot group was approximately 25 to 100, depending on the method used (Cooper & Emory 1995; Zikmund 2000). Therefore, the revised questionnaire was pilot tested among 40 employees, including managers and staff, in different departments and sections of a life insurance company in Taiwan.

The draft research instrument in Chinese version was administered to the target

sample. The questionnaire was distributed via the help of a contact person, who was a division chief in the selected life company. Participation was voluntary and the subjects were allowed to complete questions at leisure and return the completed questionnaire to the contact person by the end of office hour. There were 26 valid responses obtained from the pilot study, yielding a 65 % response rate.

The results of the pilot study showed that the draft instrument worked perfectly. It was distributed to various respondents in terms of tenure, gender, age, position, job and educational background. Reliability tests were used to analyze the data collected from the pilot study. Reliability tests were used to analyze the data collected from the pilot study and the values representing the internal consistency of the constructs were considered to be acceptable. Details are presented in the subsequent sections.

7.5.1 Demographic Information of Pilot Study

The responses of the pilot study comprised of 38.5% male and 61.5% female. There were 19.2% of the respondents in the age group of 20 to 30, 46.2% in 31 to 40, 26.9% in 41 to 50 and 7.7% in 51 or above. 11.5% of the respondents' educational background was high school or equivalent, 34.6% was technical college and 53.8 % was bachelor. There were 3.8% of the respondents holding the position of department manger, 15.4% were assistant managers and 76.9% were office staff. The main jobs of the respondents included various areas as follows: 26.9% in underwriting, 3.8% in claim, 26.9% in marketing, 7.7% in customer service, 3.8% in policy service, (e.g., policy alteration, loan and surrender), 15.4% in premium collecting and bookkeeping, 7.7% in accounting and 7.7% in registrar. 19.2% of the respondents have worked in the current companies for less than 2 years, 7.7% for 2 more to 5 years, 30.8% for 5 more to 10 years, 23.1% for 10 more to 15 years and 19.2% for more than 15 years.

7.5.2 Reliability Tests of Pilot Study

The empirical pilot study was quantitative in nature and the internal consistency of the scales was the main concern in this phase. The assessment of reliability, using SPSS software, was conducted based on Cronbach's alpha guideline (Straub 1989). Table 7-13 indicated that all but one construct exceeded the 0.7 benchmark.

Individual characteristics, information technology support, knowledge management promotion, organizational characteristics, cultural factors, perceived usefulness, complexity, subjective norm, attitude toward knowledge management adoption, knowledge management practice and perceived expected performance had high alpha values of 0.923, 0.955, 0.939, 0.882, 0.945, 0.941, 0.958, 0.916, 0.898, 0.954 and 0.974 respectively. The only one construct with an alpha value below 0.7 was for environments and industrial factors, of which the Cronbach's alpha value was 0.693. Nevertheless, since the items of environments and industrial factors were gathered from previous studies and confirmed by the interviewees in the field study, the construct with an alpha value more than 0.6 were considered to be acceptable (Nunnally & Bernstein 1994). In addition, Hulland (1999) suggested that low item reliability might be caused by inappropriate wording and/or translation. Therefore, some revisions were made to clarify the items in the construct of environments and external factors. Finally, other minor amendments were undertaken for the research instrument to be used in the main survey.

Table 7-13 Results of Reliability Testing for the Pilot Study

No.	Constructs	Cronbach's Alpha (α)
1	Environments and Industrial Factors	0.693
2	Individual Characteristics	0.923
3	IT Support	0.955
4	KM Promotion	0.939
5	Organizational Characteristics	0.882
6	Cultural Factors	0.945
7	Perceived Usefulness	0.941
8	Complexity	0.958
9	Subjective Norm	0.916
10	Attitude toward KM Adoption	0.898
11	KM Practice	0.954
12	Perceived Expected Performance	0.974

7.6 Summary

This chapter presented eighteen hypotheses that were derived from the combined research model described in the previous chapter. A description of the relevant literature and supports from the field study are provided. The research questionnaire was designed in the sequence as follows. The opening part gave the instructions regarding the research, the middle part contained the items measuring the associated constructs, and the ending part was provided to collect the respondents' demographic information. This chapter also summarizes the sources of the measurements for twelve constructs in this research. Some minor adjustments were made via the procedures of back translation and pretest. Lastly, the questionnaire was distributed to forty employees in a life insurance company for pilot testing. The results from the pilot survey indicated that the research instrument was fairly reliable and therefore the final survey questionnaire was produced. The subsequent chapter will present the administration of the main survey and its findings through Partial Least Squares analysis techniques.

Chapter 8 ADMINISTRATION AND ANALYSIS OF SURVEY

8.1 Introduction

The primary instrument for collecting data in the national main survey was the questionnaire as proposed in Chapter 7. The research questionnaire was distributed to the managers and staff among the life insurance enterprises in Taiwan. The first section in this chapter details the approaches used in operating the nation-wide main survey. This is followed by a presentation of the demographic information of the respondents. The ensuing sections describe the step-wise procedures of Partial Least Squares in analyzing the survey data. The assessments of the PLS model consist of the evaluation of the measurement model and the appraisal of the structural model. The results of the main survey are discussed in detail according to the standard for each assessment, which has been outlined in Chapter 5. This chapter concludes with the findings of the national survey by presenting the outcomes of testing the proposed hypotheses.

8.2 Administration of Main Survey

The nation-wide survey was administered to 605 subjects within different departments

and sections of eight life insurance companies in Taiwan, comprising two local companies, four local companies with foreign capital and two foreign companies. There are currently twenty-nine life insurance companies in Taiwan. Using the approach of cross-sectional studies, various segments of Taiwan life insurance industry were sampled at a single point in time and the selected companies varied in terms of history, size and location (Zikmund 2000). The participating companies were approached via phone to obtain their approval and identify the contact persons. The contact persons were then given the information regarding the purpose of the study, the instruction and the target sample before they distributed the questionnaires through their companies' internal mailing systems. They were requested to distribute the questionnaires randomly across departments and divisions and the research subjects were the office managers and staff, who worked full time and were involved in knowledge work to some extent in the company.

The packages of research instruments contained survey cover letters (see Appendix D), general instructions, prepaid and self-addressed envelops and questionnaire. As in the pilot study, participation in this stage was voluntary and all individual responses were treated confidential and anonymous. Due to high load at jobs, the respondents were given two weeks to fill out and return the questionnaires. However, after the two weeks has elapsed, phone calls were made to the contact persons in the respective companies to encourage the return of more completed questionnaires. The packages, consisting of follow-up letters (see Appendix E), copies of questionnaire and reply-paid envelops, were provided to improve the response rate. A copy of the final research questionnaire in Chinese version is presented in Appendix G.

From the 605 questionnaires distributed, a total of 362 valid responses were collected, resulting in a 59.8% effective response rate. It was found that, in the originally returned 367 questionnaires, 5 responses were incomplete and so were discarded. However, for the nation-wide main survey, the final response rate obtained was well above 30% and considered very satisfactory (Cooper & Emory 1995).

8.3 Demographic Information

Demographic characteristics of the respondents in the main survey are summarized in Table 8-1.

Table 8-1 Demographic Information of Main Survey

Demographic Characteristics		Frequency	Percentage (%)
1. How long have you worked in the current company?			
(1)	Less than 2 years	77	21.3
(2)	2+ to 5 years	68	18.8
(3)	5+ to 10 years	114	31.5
(4)	10+ to 15 years	78	21.5
(5)	More than 15 years	25	6.9
2. Gender:			
(1)	Male	131	36.2
(2)	Female	229	63.6
3. Age:			
(1)	20 or below	2	0.6
(2)	21-30	108	29.8
(3)	31-40	192	53.0
(4)	41-50	58	16.0
(5)	51 or above	1	0.3
4. Position:			
(1)	Vice President or above	1	0.3
(2)	Assistant Vice President	3	0.8
(3)	Office Director	3	0.8
(4)	Department Manager	8	2.2
(5)	Associate Manager	31	8.6
(6)	Assistant Manager	18	5.0
(7)	Division Chief	4	1.1

(8)	Supervisor	17	4.7
(9)	Staff	277	76.5
5. Job Description:			
(1)	Underwriting	48	13.3
(2)	Claim	85	23.5
(3)	Marketing	12	3.3
(4)	Customer Service	61	16.9
(5)	Policy Service (Policy Alteration, Loan, Surrender, etc.)	23	6.4
(6)	Premium (Premium Collecting and Bookkeeping)	16	4.4
(7)	Training	14	3.9
(8)	Information Technology	26	7.2
(9)	Accounting, Financial and Investment	16	4.4
(10)	Actuarial and Product Development	3	0.8
(11)	Human Resource	13	3.6
(12)	Legal Affairs	21	5.8
(13)	Registrar	39	10.8
(14)	Others	48	13.3
6. Education:			
(1)	High School or equivalent	20	5.5
(2)	Technical School	85	23.5
(3)	Tertiary	209	57.7
(4)	Master Degree or above	47	13.0

The responses comprised of 36.2% male and 63.6% female. The majority (53.0%) of them were in the age group of 31 to 40; only 0.6% were 20 or below, 29.8% in 21 to 30, and 16.3% were over 41. Most of the respondents' educational background was tertiary (57.7%), followed by technical school (23.5%). In terms of the tenure in the company, 40.1% of the participants had less than 5-year working experience in the current company, while 53% had worked for more than 5 years, and 6.9% for more than 15 years. 5.5% of the respondents' educational background was high school or equivalent, 23.5% was technical school, 57.7 % was tertiary and 13.0% was master

degree or above. There were 0.3% of the respondents holding the position of vice president or above, 0.8% were assistant vice presidents, 0.8% were office directors, 2.2% were department mangers, 8.6% were associate managers, 5.0% were assistant managers, 1.1% were division chiefs and 4.7% were supervisors. Accordingly, there were 23.5% office managers along with 76.5% office staff involved participating in the main survey. The main jobs of the respondents included various areas as follows: 13.3% in underwriting, 23.5% in claim, 3.3% in marketing, 16.9% in customer service, 6.4% in policy service, (e.g., policy alteration, loan and surrender), 4.4% in premium collecting and bookkeeping, 3.9% in training, 7.2% in information technology, 4.4% in accounting, 0.8 in actuarial and product development, 3.6% in human resource, 5.8% in legal affairs, 10.8% in registrar and 13.3% in others. The results indicated that the respondents were diverse in terms of tenure, gender, age, position, job and education.

8.4 Data Analysis via PLS

The nation-wide main survey data were analyzed through Structural Equation Modeling (SEM) techniques using PLS-Graph 3.0 (www.plsgraph.com). Before analyzing the data, its properties were assessed in advance. The raw data showed some missing values, which were thus imputed using Estimated Means (EM) method. In terms of number of cases, the guideline in PLS analysis is that the sample should have at least ten times more data-points than the number of items in the most complex formative construct in the model (Gefen, Straub & Boudreau 2000). Details of the sampling rule are described in Section 5.3.3.2.1. The main survey data with 362 cases met the sample size requirement and were considered to be appropriate for the analysis using PLS.

Moreover, PLS has been designed to accommodate both formative and reflective indicators of constructs (Barclay, Higgins & Thompson 1995). Gefen, Straub and Boudreau (2000) suggest that formative indicators "cause" the latent construct and the construct is a function of the formative measures. The formative indicators represent different dimensions of the construct and thus are not assumed to be correlated. Reflective indicators, on the other hand, "reflect" the latent construct and are expressed as a function of the construct. The reflective indicators measure the same

underlying dimension and should be correlated. In this study, the observed variables of environments and industrial factors (EI) and information technology support (IT), gathered from different dimensions to measure the constructs, are considered as the formative indicators, and other constructs are viewed as composed of reflective indicators, measuring the identical dimensions to reflect their corresponding latent constructs.

According to Barclay, Higgins and Thompson (1995), a PLS model is analyzed in two stages: (1) assessing the reliability and validity of the measurement model; and (2) assessing the structural model. Such a sequence is to ensure that reliable and valid measures of constructs are obtained before attempting to draw conclusions of the relationships among the constructs. However, it should be noted that formative indicators have several characteristics, including that, (i) the correlations among formative indicators are not explained by the measurement model; (ii) specific pattern of signs or magnitudes do not describe the correlations among formative indicators; and (iii) formative indicators do not have errors terms (Bollen & Lennox 1991; Diamantopoulos & Winklhofer 2001; Santosa, Wei & Chan 2005). Barclay, Higgins and Thompson (1995), Chin (1998), as well as Santosa, Wei and Chan (2005) indicate that the use of loading for formative indicators is misleading. Internal consistency is of minimal importance for formative indicators. For instance, two variables that might be negatively related can both serve as meaningful indicators for a construct (Nunnally & Bernstein 1994; Santosa, Wei & Chan 2005.) As to reflective indicators, viewed as measures reflecting the unobserved constructs, with the construct giving rise to the observed measures, it is appropriate to test reliability and validity (Hulland 1999). However, a constructs with formative indicators is completely determined by a linear combination of its indicators and hence reliability and validity for the formative indicators constructs are considered irrelevant (Hulland 1999; Santosa, Wei & Chan 2005).

Therefore, the data analysis presented below, particularly in the measurement model, is for reflective constructs only. For constructs with formative indicators, which are environments and industrial factors, as well as information technology support, it is the indicators' weights (see table 8-2) that are estimated since they reveal the relative

importance of the formative indicators toward the formation of the correspondent latent variables.

Table 8-2 Weight of Formative Indicators to their Respective Latent Constructs

Construct	Items		Weight
Environments and Industrial Factors (EI)	Industrial competition	EI1	0.334
	Trend	EI2	0.188
	Rules and regulations	EI3	0.253
	Customer complains and disputes	EI4	0.296
	High development of IT	EI5	0.269
	Use of a great amount of paper	EI6	0.017
IT Support (IT)	Hardware infrastructure	IT1	0.211
	Software infrastructure	IT2	0.027
	Correct and integrated information	IT3	0.091
	Compatibility	IT4	0.424
	Function	IT5	0.126
	Data updating and maintenance	IT6	0.072
	Testing and adjustment	IT7	0.059
	Security of data and system	IT8	-0.019
	Cooperation and communication	IT9	0.159
	Funny and interesting design	IT10	0.021

8.5 Assessment of Measurement Model

The measurement model depicts how the latent constructs are measured in terms of the observed variables and their measurement properties. It is recommended to have satisfied the measurement model properties before proceeding to the structural model (Barclay, Higgins & Thompson 1995; Fornell & Larcker 1981). The measurement model was assessed in the following sections by examining: (1) individual item reliability, (2) internal consistency; and (3) discriminant validity (Barclay, Higgins & Thompson 1995; Hulland 1999).

8.5.1 Item Reliability

The individual item reliability was assessed by examining the item loadings; namely, the correlations of the measures with their respective construct. The most frequently cited rule-of thumb is to retain only those items with loading greater than or equal to 0.7, which implies that there is more shared variance between the construct and its measure than error variance (Hulland 1999; Carmines & Zeller 1981). Table 8-3 presents the item loadings of 85 reflective indicators in the measurement model.

Table 8-3 Item Loadings of the Initial Model

Construct	Item		Loading
Individual Characteristics	Educational background	IN1	0.629
	Position	IN2	0.687
	Work domain	IN3	0.734
	Computer background and skill	IN4	0.675
	Individual innovativeness	IN5	0.715
	Work attitude	IN6	0.741
	Personality	IN7	0.746
	Habit of using computers and internet	IN8	0.575
	Loyalty and belonging to the company	IN9	0.571
KM Promotion	KM manager	KM1	0.723
	KM plan or project	KM2	0.770
	KM team	KM3	0.769
	Top management support	KM4	0.779
	Human and financial support	KM5	0.771
	Transmission of the KM mission	KM6	0.796
	Time schedule and guidelines	KM7	0.800
	Training	KM8	0.842
	Participation of the department representatives	KM9	0.781
	Support of time and space	KM10	0.805
	Knowledge transfer channel	KM11	0.838

	Knowledge type	KM12	0.807
	Reward for KM	KM13	0.715
	KM performance evaluation	KM14	0.629
Organizational Characteristics	Size	OR1	0.683
	Structure	OR2	0.758
	Vision, value and objective	OR3	0.838
	Strategy and policy	OR4	0.823
	Organizational learning	OR5	0.797
	The system for duty rotation and acting duty	OR6	0.750
	Employee turnover rate	OR7	0.713
	History of organization	OR8	0.658
	Variety of product	OR9	0.619
Cultural Factors	Knowledge-intensive culture	CU1	0.783
	Team-work culture	CU2	0.871
	Trust and commitment	CU3	0.835
	Respect	CU4	0.843
	Encouragement of exploration	CU5	0.854
	Encouragement of asking for help	CU6	0.883
	Encouragement of interaction with others	CU7	0.850
Perceived Usefulness	Work and service quality	PU1	0.850
	Work quantity	PU2	0.781
	Time saving	PU3	0.866
	Efficiency	PU4	0.851
	Making it easier to work	PU5	0.840
	Convenience and flexibility	PU6	0.831
	Meeting the needs at work	PU7	0.864
	Effectiveness	PU8	0.827
	Professional competency	PU9	0.815
	Reducing the mistakes	PU10	0.831
	Reducing the duplicate work	PU11	0.819
	Making it easier to learn	PU12	0.774

	Promotion/ Raise	PU13	0.572
Complexity	Not friendly to use	CM1	0.896
	Taking too much time	CM2	0.902
	Not simple, clear and short enough	CM3	0.909
	No assistance in time	CM4	0.888
	Lack of accessibility	CM5	0.904
	Not easy in the practical operation	CM6	0.875
Subjective Norm	Peer pressure	SN1	0.765
	Co-workers' adoption and comments	SN2	0.757
	Supervisor	SN3	0.838
	Senior management	SN4	0.815
	Opinion leader	SN5	0.809
	Requirement of company	SN6	0.814
	Prestige/profile/status	SN7	0.723
Attitude toward KM Adoption	A good idea	AT1	0.825
	Interesting	AT2	0.898
	Fun	AT3	0.828
	Likes	AT4	0.881
KM Practice	Gathering knowledge	KP1	0.850
	Identifying Knowledge	KP2	0.887
	Organizing knowledge	KP3	0.876
	Sharing knowledge	KP4	0.850
	Converting knowledge	KP5	0.883
	Using knowledge	KP6	0.901
	Having KM a part of ordinary jobs	KP7	0.853
Perceived Expected Performance	Customer service	PEP1	0.878
	Overall operational efficiency	PEP2	0.873
	Cost down	PEP3	0.781
	Ability to adapt to changes	PEP4	0.890
	Reputation and public praise	PEP5	0.830
	Improving workers' quality	PEP6	0.841
	Providing information for decision makers	PEP7	0.830

	Keeping the record of workers' experience in the company	PEP8	0.828
	Decreasing the impact of turnover	PEP9	0.777

Results of the initial model showed that IN1, IN2, IN4, IN8, IN9, KM14, OR1, OR8, OR9 and PU13 had loadings less than 0.7. These 10 items were removed from the model for further analysis for the arguments elucidated below.

Despite the fact that educational background, position, and computer skill were suggested to be significant in influencing the adoption/diffusion of a new system (Liu 2004 & Lo 2003), they were not necessarily the major indicators for measuring the individual characteristics in affecting the adoption and practice of "knowledge management", which involved not only information systems, but also overall changes from recognition to use of knowledge in the company. IN8 (habit of using computers and internet) and IN9 (loyalty and belong to the company) with loadings below 0.6 were discarded. The rationale for such low loadings was that the two items were simply gathered from the field and were not commonly believed to be substantial in the individual characteristics to affect a person's thought regarding knowledge management. Alavi and Leidner (1999) stated that, knowledge management should be linked to organizational performance, and development of meaningful metrics for measuring KM performance was a key factor for long-term success of knowledge management system. However, KM performance evaluation might not be considered as primary in the initial stage of promoting knowledge management. Similarly, while size was identified as one of the organizational characteristics that might influence the innovativeness of an organization (Rogers 1995), it was not verified in this study to have satisfactory power in explaining organizational characteristics. The items of OR8 and OR9 were only offered from company C, maintaining that history of organization and variety of product could be the stimuli to adopt and apply knowledge management in organizations. Such arguments seemed not be agreed from the perspectives of employees. Finally, the item of PU 13 (promotion/raise) was supported by the literature (Compeau & Higgins 1995; Compeau, Higgins & Huff 1999), while not confirmed via the field study. The loading of 0.572 revealed that increasing the chances of having promotion or raise were not significant for employees

in perceiving knowledge management.

As a result, the items with loadings below the benchmark 0.7 were discarded. It was also based on the fact that removing these items would not change or weaken the underlying constructs (Nunnally & Bernstein, 1994). Discarding these items was deemed to prevent the lessening of the estimates of the relationships among the constructs. Therefore, in the interest of minimizing the potential biases that these items could introduce, the model was revised with 91 observed variables (i.e., 16 formative indicators and 75 reflective indicators) for the subsequent analysis using PLS, after dropping 10 items.

8.5.2 Internal Consistency

The internal consistency of latent construct was examined by evaluating the composite reliability with an acceptable value of 0.7 (Barclay, Higgins & Thompson 1995; Fornell & Larker, 1981). Table 8-4 shows that all constructs in the measurement model exceed the minimum requirement for reliability. The constructs of individual characteristics, knowledge management promotion, organizational characteristics, cultural factors, perceived usefulness, complexity, subjective norm, attitude toward knowledge management adoption, knowledge management practice and perceived expected performance, had high composite reliability scores more than 0.9. Moreover, as recommended by Fornell and Larcker (1981), the Average Variance Extracted (AVE), e.g., the averaged variable share between a construct and its measures, should be equal to or above 0.5. The results as seen in Table 8-4 also reveal that that the AVE values of all constructs exceed the threshold of 0.5.

Table 8-4 Internal Consistency

Latent Construct		Composite Reliability	AVE
Individual Characteristics	IN	0.866	0.619
KM Promotion	KM	0.955	0.619
Organizational Characteristics	OR	0.912	0.635
Cultural Factors	CU	0.946	0.716
Perceived Usefulness	PU	0.964	0.690
Complexity	CM	0.960	0.802
Subjective Norm	SN	0.920	0.623
Attitude toward KM Adoption	AT	0.918	0.736
KM Practice	KP	0.957	0.760
Perceived Expected Performance	PEP	0.955	0.701

8.5 3 Discriminant Validity

The test of discriminant validity measures the extent to which a given construct differs from other constructs (Barclay, Higgins & Thompson 1995). The first assessment for discriminant validity is that a construct should share more variance with its measures than it shares with other constructs in the measurement model (Barclay, Higgins & Thompson 1995; Hulland 1999). According to Barclay, Higgins and Thompson (1995), as well as Hulland (1999), the square root of the average variable extracted (AVE) of a construct should be greater than the correlations between this construct and other constructs. Table 8-5 presents the correlation matrix for the constructs. In this matrix, the diagonal elements, square roots of the AVE, should be greater than the off-diagonal elements in the corresponding rows and columns. The assessment indicates that all constructs meet the first discriminant validity criterion.

Table 8-5 Correlation Matrix for the Constructs

	IN	KM	OR	CU	PU	CM	SN	AT	KP	PEP
IN	0.787									
KM	0.597	0.787								
OR	0.568	0.670	0.797							
CU	0.604	0.697	0.667	0.846						
PU	0.577	0.727	0.628	0.653	0.831					
CM	0.396	0.401	0.412	0.335	0.459	0.896				
SN	0.425	0.498	0.468	0.410	0.467	0.340	0.789			
AT	0.520	0.588	0.544	0.608	0.672	0.338	0.452	0.858		
KP	0.465	0.527	0.483	0.497	0.565	0.236	0.451	0.587	0.872	
PEP	0.589	0.666	0.569	0.595	0.742	0.348	0.535	0.689	0.722	0.837

(Note: the bold elements in the main diagonal are the square roots of AVE)

The second criterion for discriminant validity is that no item should load higher on another construct than it does on the construct it aims to measure (Barclay, Higgins & Thompson 1995). It can be evaluated by performing cross-loading analysis. Table 8-6 demonstrates that all items loaded higher on the construct that they were measuring than they did on the other constructs in the model. Therefore, all constructs in the measurement model meet the second discriminate validity requirement.

Table 8-6 Cross Loadings

	IN	KM	OR	CU	PU	CM	SN	AT	KP	PEP
IN3	0.747	0.481	0.456	0.455	0.470	0.401	0.347	0.412	0.336	0.429
IN5	0.741	0.409	0.362	0.377	0.391	0.292	0.300	0.370	0.283	0.413
IN6	0.826	0.509	0.488	0.537	0.486	0.268	0.320	0.444	0.445	0.510
IN7	0.828	0.470	0.470	0.520	0.458	0.274	0.365	0.403	0.390	0.495
KM1	0.507	0.726	0.565	0.519	0.495	0.331	0.354	0.446	0.446	0.476
KM2	0.472	0.774	0.566	0.573	0.544	0.370	0.417	0.468	0.442	0.498
KM3	0.479	0.776	0.516	0.570	0.523	0.355	0.356	0.467	0.442	0.501

KM4	0.473	0.786	0.515	0.517	0.539	0.400	0.402	0.427	0.366	0.478
KM5	0.463	0.779	0.456	0.501	0.513	0.322	0.367	0.428	0.379	0.501
KM6	0.457	0.805	0.489	0.591	0.561	0.276	0.357	0.477	0.376	0.500
KM7	0.508	0.800	0.569	0.618	0.606	0.231	0.419	0.511	0.445	0.563
KM8	0.490	0.844	0.541	0.576	0.608	0.326	0.422	0.462	0.431	0.569
KM9	0.456	0.784	0.534	0.532	0.577	0.249	0.374	0.497	0.417	0.536
KM10	0.448	0.807	0.525	0.507	0.630	0.335	0.383	0.414	0.377	0.531
KM11	0.512	0.837	0.564	0.582	0.650	0.298	0.449	0.529	0.480	0.604
KM12	0.458	0.806	0.548	0.584	0.638	0.325	0.402	0.515	0.433	0.584
KM13	0.389	0.693	0.466	0.454	0.527	0.283	0.379	0.366	0.348	0.450
OR2	0.373	0.510	0.719	0.476	0.465	0.257	0.381	0.383	0.373	0.409
OR3	0.522	0.561	0.876	0.616	0.545	0.361	0.373	0.474	0.425	0.501
OR4	0.484	0.580	0.877	0.573	0.510	0.363	0.365	0.477	0.406	0.482
OR5	0.496	0.601	0.838	0.583	0.567	0.427	0.408	0.505	0.430	0.512
OR6	0.445	0.519	0.757	0.499	0.501	0.296	0.352	0.425	0.350	0.439
OR7	0.372	0.405	0.694	0.408	0.385	0.218	0.367	0.294	0.309	0.348
CU1	0.574	0.650	0.541	0.784	0.599	0.357	0.355	0.555	0.401	0.557
CU2	0.519	0.595	0.571	0.871	0.551	0.225	0.355	0.537	0.443	0.510
CU3	0.521	0.579	0.606	0.834	0.520	0.242	0.376	0.438	0.436	0.470
CU4	0.500	0.545	0.566	0.843	0.509	0.244	0.363	0.429	0.408	0.468
CU5	0.496	0.602	0.564	0.854	0.577	0.336	0.305	0.567	0.423	0.515
CU6	0.482	0.578	0.547	0.883	0.579	0.316	0.336	0.549	0.399	0.502
CU7	0.478	0.567	0.556	0.850	0.523	0.249	0.337	0.516	0.433	0.490
PU1	0.535	0.648	0.518	0.599	0.857	0.402	0.416	0.615	0.514	0.635
PU2	0.464	0.580	0.479	0.550	0.780	0.325	0.402	0.538	0.390	0.578
PU3	0.445	0.600	0.505	0.524	0.868	0.365	0.409	0.526	0.410	0.602
PU4	0.459	0.604	0.487	0.555	0.855	0.348	0.376	0.549	0.435	0.605
PU5	0.433	0.587	0.508	0.505	0.838	0.406	0.378	0.553	0.474	0.619
PU6	0.439	0.605	0.537	0.508	0.838	0.405	0.357	0.515	0.438	0.623
PU7	0.479	0.629	0.578	0.572	0.864	0.404	0.427	0.589	0.513	0.621
PU8	0.462	0.639	0.508	0.493	0.835	0.429	0.389	0.598	0.465	0.636
PU9	0.525	0.629	0.560	0.600	0.811	0.390	0.374	0.605	0.513	0.627

PU10	0.512	0.579	0.573	0.544	0.828	0.366	0.389	0.518	0.516	0.626
PU11	0.483	0.570	0.524	0.523	0.820	0.411	0.390	0.548	0.472	0.620
PU12	0.505	0.568	0.474	0.531	0.772	0.311	0.339	0.526	0.475	0.599
CM1	0.379	0.370	0.384	0.307	0.441	0.896	0.332	0.323	0.191	0.307
CM2	0.368	0.369	0.351	0.277	0.426	0.902	0.278	0.266	0.204	0.300
CM3	0.341	0.355	0.384	0.319	0.406	0.909	0.294	0.301	0.232	0.327
CM4	0.353	0.345	0.360	0.326	0.411	0.888	0.279	0.323	0.229	0.323
CM5	0.356	0.356	0.373	0.277	0.410	0.903	0.308	0.302	0.205	0.326
CM6	0.327	0.361	0.357	0.291	0.368	0.874	0.334	0.299	0.205	0.288
SN1	0.273	0.335	0.325	0.229	0.284	0.275	0.765	0.310	0.270	0.333
SN2	0.274	0.378	0.303	0.262	0.276	0.276	0.757	0.305	0.299	0.340
SN3	0.312	0.354	0.346	0.282	0.338	0.281	0.838	0.265	0.326	0.364
SN4	0.382	0.448	0.419	0.359	0.433	0.323	0.815	0.354	0.401	0.462
SN5	0.355	0.441	0.374	0.391	0.371	0.205	0.809	0.419	0.427	0.472
SN6	0.326	0.374	0.382	0.305	0.387	0.298	0.814	0.340	0.357	0.441
SN7	0.378	0.381	0.398	0.370	0.431	0.237	0.722	0.435	0.358	0.475
AT1	0.543	0.620	0.471	0.525	0.685	0.416	0.450	0.828	0.548	0.675
AT2	0.442	0.482	0.501	0.568	0.556	0.261	0.397	0.897	0.490	0.580
AT3	0.320	0.379	0.372	0.462	0.448	0.178	0.350	0.825	0.423	0.468
AT4	0.440	0.495	0.504	0.522	0.575	0.265	0.338	0.881	0.529	0.605
KP1	0.383	0.453	0.442	0.418	0.459	0.203	0.408	0.501	0.850	0.600
KP2	0.437	0.482	0.455	0.445	0.532	0.235	0.429	0.527	0.887	0.649
KP3	0.379	0.420	0.385	0.421	0.462	0.198	0.370	0.549	0.876	0.596
KP4	0.398	0.503	0.389	0.451	0.509	0.212	0.432	0.499	0.850	0.640
KP5	0.385	0.427	0.392	0.427	0.475	0.186	0.362	0.494	0.883	0.613
KP6	0.454	0.522	0.469	0.438	0.578	0.285	0.402	0.520	0.901	0.672
KP7	0.398	0.400	0.414	0.431	0.423	0.111	0.346	0.489	0.853	0.629
PEP1	0.514	0.616	0.523	0.535	0.679	0.351	0.440	0.602	0.638	0.878
PEP2	0.506	0.607	0.501	0.524	0.680	0.323	0.453	0.620	0.620	0.873
PEP3	0.397	0.483	0.405	0.423	0.530	0.250	0.431	0.542	0.539	0.781
PEP4	0.550	0.573	0.503	0.553	0.633	0.291	0.476	0.643	0.678	0.890
PEP5	0.486	0.522	0.451	0.507	0.568	0.213	0.465	0.559	0.578	0.830

PEP6	0.527	0.522	0.457	0.495	0.624	0.240	0.488	0.545	0.585	0.841
PEP7	0.481	0.553	0.465	0.508	0.646	0.295	0.416	0.567	0.626	0.830
PEP8	0.493	0.601	0.465	0.462	0.639	0.349	0.450	0.556	0.598	0.828
PEP9	0.469	0.527	0.512	0.462	0.577	0.306	0.418	0.550	0.559	0.776

8.6 Assessment of Structural Model

The structural model was evaluated in terms of the explanatory power and significance of paths among the constructs. The assessment was conducted using the bootstrapping technique in PLS and described in the subsequent sections.

8.6.1 R^2 value

The bootstrapping method produces R^2 values that are assessed as a measure of the predictive power of the model for the endogenous constructs (Barclay, Higgins & Thompson 1995). Barclay, Higgins and Thompson (1995) suggest that the interpretation of R^2 in a PLS context is similar to the results in multiple regression analyses. The R^2 values detailed in table 8-7 show that the structural model explains 62.1% of the variance in Perceived Usefulness, 24.6% of the variance in Complexity, 16.8% of the variance in Subjective Norm, 49.3% of the variance in Attitude toward KM Adoption, 34.4% of the variance in KM practice. It also explains 52.1% of the variance in perceived expected performance, which is reasonably good.

Table 8-7 R^2 Values of the Construct

Construct		R^2
Perceived Usefulness	PU	0.621
Complexity	CM	0.246
Subjective Norm	SN	0.168
Attitude toward KM Adoption	AT	0.493
KM Practice	KP	0.344
Perceived Expected Performance	PEP	0.521

8.6.2 Hypothesis Testing

The bootstrapping technique employs a test similar to the traditional t-test and the results can be used to interpret the significance of the paths between model constructs (Barclay, Higgins & Thompson 1995). Appendix H presents the results produced by PLS bootstrapping approach. The results of the structural model analysis via PLS are diagrammatically represented as Figure 8-1. The path coefficients and t-statistic results of the bootstrapping calculations are summarized in Table 8-8.

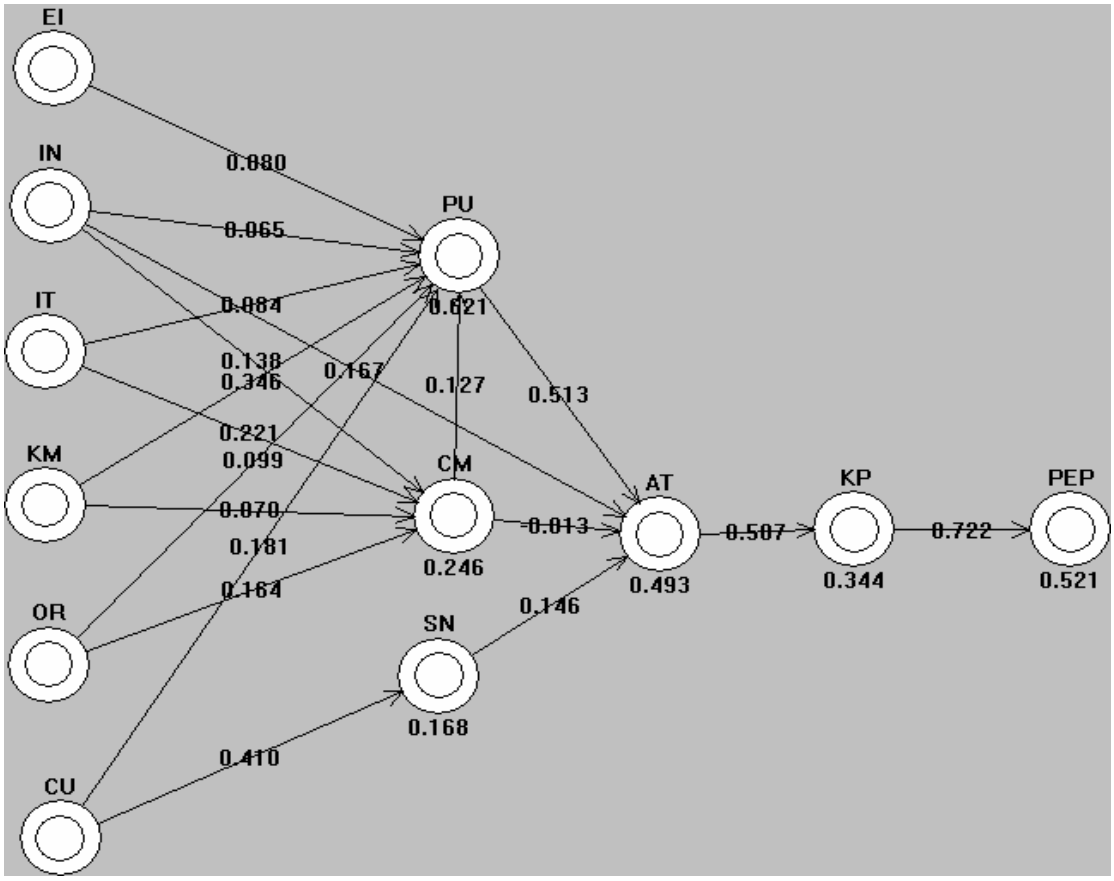

Figure 8-1 Structural Model via PLS

Table 8-8 Results of Hypothesis Testing

Hypothesis		Findings		Support of Hypothesis at $t_{0.05} > 1.645$
		γ	t-value	
H1	"Environments and Industrial Factors" positively influence the "Perceived Usefulness" of Knowledge Management.	0.080	1.717	Yes
H2a	"Individual Characteristics" positively influence the "Perceived Usefulness" of Knowledge Management.	0.065	1.322	No
H2b	"Individual Characteristics" negatively influence the "Complexity" of Knowledge Management.	0.138	1.989	No
H2c	"Individual Characteristics" positively influence the "Attitude toward Knowledge Management Adoption".	0.167	3.398	Yes
H3a	"Information Technology Support" positively influences the "Perceived Usefulness" of Knowledge Management.	0.084	1.625	No
H3b	"Information Technology Support" negatively influences the "Complexity" of Knowledge Management.	0.221	3.283	No
H4a	"Knowledge Management Promotion" positively influences the "Perceived Usefulness" of Knowledge Management.	0.346	4.536	Yes
H4b	"Knowledge Management Promotion" negatively influences the "Complexity" of Knowledge Management.	0.070	0.971	No

H5a	"Organizational Characteristics" positively influence the "Perceived Usefulness" of Knowledge Management.	0.099	1.536	No
H5b	"Organizational Characteristics" negatively influence the "Complexity" of Knowledge Management.	0.164	2.005	No
H6a	"Cultural Factors" positively influence the "Perceived Usefulness" of Knowledge Management.	0.181	2.947	Yes
H6b	"Cultural Factors" positively influence the "Subjective Norm" of Knowledge Management.	0.410	8.368	Yes
H7	"Perceived Usefulness" positively influences the "Attitude toward Knowledge Management Adoption".	0.513	10.386	Yes
H8	"Complexity" negatively influences the "Attitude toward Knowledge Management Adoption".	-0.013	0.239	No
H9	"Complexity" negatively influences the "Perceived Usefulness".	0.127	2.913	No
H10	"Subjective Norm" positively influences the "Attitude toward Knowledge Management Adoption".	0.146	2.385	Yes
H11	"Attitude toward Knowledge Management Adoption" positively influences the "Knowledge Management Practice".	0.587	13.829	Yes
H12	"Knowledge Management Practice" positively influences the "Perceived Expected Performance" of Knowledge Management.	0.722	20.341	Yes

Hypothesis H1 was tested to explore the role of environments and industrial factors in stimulating KM adoption and practice by influencing the perceived usefulness. In this study, the positive influence of environments and industrial factors on the perceived usefulness was found to be significant (γ=0.080, t-value=1.717). Hence, Hypothesis H1, proposing that environments and industrial factors (e.g., competition, regulations and customer demand) positively influence the perceived usefulness of knowledge management, was supported.

The impacts of individual characteristics on perceived usefulness, complexity and attitude toward adopting KM are investigated in Hypotheses H2a, H2b and H2c respectively. While individual characteristics have been considered to be basic factors in predicting people's behavioral believes (Ajzen & Fishbein 1980), the positive influence of individual characteristics on perceived usefulness was not found to be significant with the results of H2a testing (γ=0.065, t-value=1.322). Besides, the suggested negative effect of individual characteristics on perceived complexity was not supported since testing hypothesis H2b (γ=0.138, t-value=1.989) indicated that the relationship between individual characteristics and complexity was positive, instead of negative. Nonetheless, individual characteristics were shown to have positive influences on the attitudinal factor and thus Hypothesis H2c (γ=0.167, t-value=3.398) was accepted.

Hypotheses H3a and H3b were concerned with exploring the effect of IT support on perceived usefulness and complexity. Both hypotheses were not supported in this research. IT support was not shown to significantly affect the perceived usefulness of KM (γ=0.084, t-value=1.625), even though such influences were suggested in previous studies of technology acceptance model (Davis, Bagozzi & Warshaw 1989; Thong, 1999; Agarwal & Prasad, 1997). Meanwhile, the impact of IT support on the perceived complexity was found to be positively significant (γ=0.221, t-value=3.283), which was different from the proposed suggestion as described in Section 7.2.1.3.

Regarding the effects of knowledge management promotion, tests of hypotheses H4a and H4b resulted in mixed outcomes. Hypothesis H4a, suggesting that KM

promotion have positive influences on perceived usefulness, was supported (γ=0.346, t-value=4.536). It is noted that the schemes to promote KM before its implementation was considered effective to increase the employees' understanding about the meanings and usefulness of KM. Nonetheless, hypothesis H4b proposing that KM promotion has negative impacts on the perceived complexity was rejected in the current study (γ=0.070, t-value=0.971).

Hypotheses H5a and H5b were tested to examining the role of organizational characteristics in KM adoption and practice via their effects on perceived usefulness and complexity. The study found that the positive influence of organizational characteristics on perceived usefulness was not statistically significant (γ=0.099, t-value=1.536). The results of testing hypothesis H5b (γ=0.164, t-value=2.005) reported that the influences of organizational characteristics on the complexity perceived by the employees were positive. Hence, the proposed negative relationship between organizational characteristics and complexity was not supported.

The significance of cultural factors in affecting perceived usefulness and subjective norm was confirmed in hypotheses H6a and H6b. Culture has been considered a major issue in pursuing successful knowledge management (Alavi & Leidner 2001; Davenport & Prusak 1998). This study shows that cultural factors have significant positive influences on employees' perceptions about the advantages of KM (γ=0.181, t-value=2.947), as well as on the subjective value among them (γ=0.410, t-value=8.368). Therefore, both hypotheses H6a and H6b were accepted.

Hypothesis H7, proposing that perceived usefulness positively influences the attitude toward KM adoption, was supported (γ=0.513, t-value=10.386). This study empirically verified the determinant role of perceived usefulness in influencing an individual's attitude toward a certain behavior, such as adopting KM in the research. The results were in line with the literature (Rogers 1995; Venkatesh & Davis 2000) stating that the perceived usefulness or relative advantages of KM would positively affect people's attitudes to adopt KM.

However, the negative influence of complexity on the attitude toward KM adoption was not found to be significant in testing hypothesis H8 (γ=-0.013, t-value=0.239). It can be observed that the value of path coefficient was negative, indicating that the impact of complexity on attitude was negative. Even so, such an effect was found to be insignificant statistically in this study.

The proposed negative impact of complexity on perceived usefulness was not significant in the results. It has been commonly reported that perceived ease of use has a direct effect on perceived usefulness (Adams, Nelson & Todd 1992; Igbaria, Guimaraes & Davis 1995; Szajna 1996). It can be inferred that, the easier a system is to use, the more effort can be given to produce better job performance since less effort is required to perform the tasks. Complexity was suggested in this study to describe the difficulty perceived in understanding and applying knowledge management, which referred to the opposite aspect of perceived ease of use. Therefore, this study proposed that complexity would negatively influence perceived usefulness in the adoption and practice of knowledge management. Nonetheless, the results (γ=0.127, t-value=2.913) showed that the path coefficient of complexity to perceived usefulness was significant, whilst the relationship was "positive", instead of "negative". Contrary to the prediction, the empirical evidence implied that the more complexity was involved in KM, the more usefulness was perceived for KM by the employees. The rationale for such findings will be further discussed in Chapter 9.

Hypothesis H10 examined the impact of subjective norm on the attitude toward KM adoption and the results showed that such a positive impact was statistically significant (γ=0.146, t-value=2.385). As suggested in previous research (Ajzen & Fishbein 1980; Davis, Bagozzi & Warshaw 1989), this empirical study showed that subjective norm had positive influences on people's behavior, such as applying knowledge management, via their attitudes toward such activities.

Hypothesis H11 investigated the influence of attitude toward KM adoption on the practice of KM. This positive influence was found to be statistically significant in this study (γ=0.587, t-value=13.829). Attitude has been identified to play an important role in predicting a person's behavior (Ajzen 1991; Ajzen & Fishbein 1980;

Carroll & Thomas 1988). Besides, almost all participants in the interviews pointed out such an attitudinal factor. The results were in line with the literature and the field study. Hypothesis H11 was accepted.

Finally, the proposition in hypothesis H12 that KM practice would positively influence the perceived expected performance was supported. The findings revealed that such a direct positive effect was statistically significant (γ=0.722, t-value=20.341). It can be inferred from the results that, the more knowledge management activities are conducted, the more organizational expected performance is perceived by the employees.

Overall, the tests of hypotheses provided mixed results on the proposed relationships. Hypotheses H1, H2c, H4a, H6a, H6b, H7, H10, H11 and H12 were accepted when t-values (0.05 level) were above 1.645. All the other proposed relationships were not shown to be significant at the 0.05 confidence level. The interpretations and discussions will be presented in next chapter.

8.7 Summary

The research instrument was distributed to 605 employees of the life insurance companies in Taiwan. A total of 362 usable responses were collected and thus resulted in a 59.8% effective response rated. Each company participating in this survey was approached via phone in advance to get the approval and identify the contact persons who could provide the assistance in distributing the questionnaire. The respondents were shown to be varied in terms of working experience in the company, current position, main job area, gender and education.

To analyze the main survey data via Partial Least Squares techniques, the discussions regarding the formative constructs and reflective constructs were provided and the weights of the formative indicators to these associated latent constructs were presented. In the assessment of the measurement model, 0.7 was adopted as the criteria to retain the items with adequate loadings and thus eleven items were removed from the initial model. A discussion of the discarded items was provided. The modified model then passed the internal consistency examination and the

composite reliability was required to be above 0.7. It was also indicated that the model had satisfactory discriminant validity through analyses of the correlation matrix, which comprises the root-square of the AVE for each reflective construct and the correlations among all reflective constructs, as well as the cross loadings of the reflective measuring items.

The results of the structural model evaluation showed that 62.1% of the variance in perceived usefulness, 24.6% of the variance in complexity, 16.8% of the variance in subjective norm, 49.3% of the variance in attitude toward km adoption and 34.4% of the variance in km practice and were explained by the structural model. As a whole, the structural model explained 52.1% of the variance in perceived expected performance. In the meantime, twelve suggested hypotheses were accepted with t-values that were over 1.645 at the confidence level of 0.05. A presentation of the path coefficients and t-statistics results for each hypothesis was provided. In the following chapter, the interpretations of these results along with their implications will be presented.

Chapter 9 DISCUSSIONS AND IMPLICATIONS

9.1 Introduction

This chapter presents the interpretations of the results obtained from the PLS analysis techniques described in the previous chapter. The findings of the main survey will be discussed in detail in terms of the eighteen research hypotheses in this study. The theoretical and practical implications of these findings will be provided.

9.2 Interpretation of the Research Model

The results of this study revealed that nine out of the eighteen hypotheses were accepted. Hypotheses regarding the following relationships were found to be significant: Environments and Industrial Factors to Perceived Usefulness (H1), Individual Characteristics to Attitude toward KM Adoption (H2c), KM Promotion to Perceived Usefulness (H4a), Cultural Factors to Perceived Usefulness (H6a), Cultural Factors to Subjective Norm (H6b), Perceived Usefulness to Attitude toward KM Adoption (H7), Subjective Norm to Attitude toward KM Adoption (H10), Attitude toward KM Adoption to KM Practice(H11), as well as KM Practice to Perceived Expected Performance (H12). However, there was lack of statistical evidence to

support the other nine hypotheses, namely H2a, H2b, H3a, H3b, H4b, H5a, H5b, H8 and H9.

As hypothesized in this research, the external factors, such as Environments and Industrial Factors, KM Promotion and Cultural Factors were seen to have influences, via Perceived Usefulness, on the Attitude toward KM Adoption, which in turn affected the Practice of KM. The activities related to KM would lead to the increase of Perceived Expected Performance. Meanwhile, Individual Characteristics were indicated to have a direct impact on the attitudinal factor in this study. Cultural Factors were shown to have significant effects on Subjective Norm, which was also a determinant factor in affecting the employees' attitudes in adopting knowledge management.

These findings confirmed that the research model using the factors extracted from the Theory of Reasoned Action (TRA), Technology Acceptance Model (TAM) and Innovation Diffusion (ID) was appropriate. The results associated with the individual hypotheses suggested and their implications are discussed in detail below.

9.2.1 Hypothesis H1

Hung, Hui-Shu (2003) suggested that the life insurance enterprises should consider environmental changes and customer demands in having knowledge management into place. Besides, industrial factors, such as the strict regulations for the life insurance industry and consuming too much paper, were originated from the field study. This study found that there was significant statistical evidence to support the positive influence of environments and industrial factors on the perceived usefulness regarding knowledge management. This finding was consistent with the previous studies (Belassi & Fadlalla 1998; Davis, Bagozzi & Warshaw 1989; Holsapple & Joshi 2000; Huang 2002; Grover 1993; Lee 1998; McGowan & Madey 1998) and the field study, arguing that environments and industrial characteristics were the external factors which affected the adoption of innovations, such as knowledge management in this study. This research verified that environments and industrial factors had a positive effect on the perceived usefulness which in turn influenced the employees' attitudes toward KM adoption and thus affected them in applying KM.

The practical implications from this finding are that, environments and industrial factors (e.g., trend of time and great competition) could stimulate the staff and managers to accept knowledge management since KM might enhance their competency in such competitive environments. For the life insurance enterprises, how to help the employees to see the demands from the market would raise their perceptions about the significance of knowledge management.

Six items were chosen to serve as the formative indicators for the construct of environments and industrial factors. The first four items, i.e., industrial competition, trend, rules and regulations, as well as customer complains and disputes, were initially acquired from the literature and amended according to the opinions of the interview participants. The findings of the quantitative data analysis by getting their weight showed that these items were relatively important to form the construct of environments and industrial factors. The two items obtained from the field study, including high development of IT and use of a great amount of paper, were also shown to be meaningful indicators for this construct. All items of environments and industrial factors in this research model have been modified for the examination on Taiwan life insurance industry, and thus are worth taking into consideration in investigating the external factors that affect the adoption and practice of KM among life insurance enterprises, especially for those in Taiwan.

9.2.2 Hypotheses H2b and H2c

Hypothesis 2b suggesting that individual characteristics would negatively influence the perceived "complexity" of knowledge management was not accepted in this study. Although individual characteristics have been identified as one of the external factors that would influence people's perceived ease of use (Davis, Bagozzi & Warshaw 1989; Igbaria, Guimaraes & Davis 1995), and individual differences, e.g., tenure and education, were reported (Agarwal & Prasad 1999) to have positive impacts on perceived ease of use, their relationships between the perceived "complexity", have not been well explored, especially in the context of knowledge management adoption and practice. This study attempted to examine such relationships by positing that individual characteristics, such as educational background and position, would

decrease the perceived complexity of employees in adopting and applying knowledge management. It was argued in the field study that a person with higher education/position would better understand the concepts and methods of knowledge management and thus not feel that it was so complicated.

However, the results of the main survey (γ=0.138, t-value=1.989) were not as expected and indicated that individual characteristics would positively influence the perceived complexity. The possible explanation is that, in the field study, most of the interviewees were in higher positions and with higher educational background, so their opinions were that those employees like them had more sense of knowledge management and therefore KM was less complex for them. Nonetheless, most of the respondents in the main survey were the staff, and they might think that knowledge management would be difficult for those senior managers because they were too busy or too old to learn and utilize new technologies, which were usually required in having knowledge management into place. Similarly, a person having higher education did not assure that he or she was proficient with using computers and associated systems. In this case, organizations could provide more support for these people to increase their skills to make it easier for them to adopt and apply knowledge management.

As to hypothesis H2c, Davenport (1996) highlighted that human labor were still necessitated for organizations to have quality knowledge management, even though the artificial intelligence had been developed. Effective management of knowledge requires mixed resolutions of both people and technology. Though the Theory of Reasoned Action (TRA) indicated that demographic variables, e.g., education and socioeconomic status, could be the external factors that would influence a person's behavior through behavioral belief, subjective norm, attitude or intention, there were few studies identified in the literature that specifically investigated the direct impact of individual characteristics on the attitude toward adopting knowledge management. This study explored such a relationship based on the opinions of three participants in the interviews. The chief of customer service section in company A sustained that a person who had enthusiasm for work would be much more willing to accept knowledge management. This argument was also supported by the manager of claim

department of company F. Besides, another interviewee from company F stated that, if an employee was very active in seeking for all possible methods or solutions for conducting the tasks, he or she would feel that knowledge management was a good idea and the option of adopting knowledge management would be pleasant for the employee.

This study empirically tested the influence of individual characteristics on the attitude toward KM adoption in a context of life insurance industry. The results revealed that such a direct relationship was positive and significant. This could provide suggestions for life insurance enterprises that, in addition to professional capabilities, some personal characteristics (e.g., passion and energy) should be taken into consideration in looking for the appropriate staff to execute the project of knowledge management.

9.2.3 Hypotheses H2a, H3a and H5a

This study did not support the statistical significance of the direct positive effects that three external factors, including individual characteristics, IT support and organizational characteristics, had on the perceived usefulness of knowledge management.

Individual characteristics, such as demographic backgrounds and personality traits, were identified to be the external factors that could influence intentions and behaviors indirectly by their effects on behavioral beliefs, outcome evaluations and so on (Ajzen & Fishbein 1980). Lo (2003) also indicated that a person's education and position had significant influence on his or her satisfaction regarding the Customer Relationship Management (CRM) system in a context of life insurance industry. Besides, past experience in using computers was found to have influences on the perceived usefulness in examining the usage of electronic system among the employees. However, the empirical results in this study (H2a) revealed that individual characteristics did not provide a direct effect on the employees' perceived usefulness in regard to knowledge management.

Even though the direct impact of individual characteristics on perceived usefulness

was not found to be significant, they were shown to directly influence an individual's attitude toward KM adoption as described above. In the PLS analysis procedures, those items, such as educational background, position and computer skill, which were obtained from previous study, were found to have loadings less than 0.7 and thus discarded from the construct of individual characteristics in analyzing the structural model in this study. It can be observed that other individual features, such as work domain, individual innovativeness, working attitude and personality, would play more significant roles in explaining the individual characteristics that affect the adoption and practice of knowledge management.

Following several TAM and KM studies (Agarwal and Prasad 1997; Alavi & Leidner 1999; Chiu 2004; Gold, Malhotra & Segars 2001; Liu 2004; Lo 2003; Thong 1999), hypothesis H3a suggested that IT Support had a positive impact on people's perceptions about the usefulness of knowledge management. The findings of this study disagreed with those of previous research. The possible explanation could be drawn form the argument of Yang (2004) in investigating the practical operations of knowledge management in life insurance enterprises. Yang (2004) unearthed that the life insurance companies had invested greatly in developing the information systems to support knowledge management, but they were still in lack of a regular KM department or team to implement knowledge management in their organizations. Davenport (1996) has also indicated that a sound knowledge management scheme consists of not only computer systems and technologies, but also some people and management disciplines to construct such mixed knowledge management environments. The results from the empirical study provided managerial implications for life insurance companies that, though information technology support was essential, merely the emphasis on IT was not enough. Upon the affiliation of information technology, other aspects, such as KM managers, support of time and space for KM and creating a knowledge-favored culture, should be supplemented to raise the employees' image regarding knowledge management.

The findings did not support hypothesis H5a recommending that Organizational Characteristics positively affected Perceived Usefulness. Though all the six interviewees alleged that the characteristics of an organization would influence the

perceived value of knowledge management among the employees, such a direct relationship was not show to be statistically significant in this study. The clue for the results could be traced from the literature. Organizational factors, e.g., size, structure and goals, have been suggested to have significant impact on the adoption and diffusion of innovation (Belassi & Fadlalla 1998; Grover 1993, Kim & Srivastava 1998; Rogers 1995; Thong 1999). Davis, Bagozzi & Warshaw (1989) and Szajna (1996) also indicated that organizational features could be the external variables that indirectly influence on behavior by affecting beliefs, attitudes and intentions. However, Davis (1993) called for future research to examine the role of external factors, such as organizational characteristics, using the framework of Technology Acceptance Model. In exploring the external factors affecting perceived usefulness, this study found that the general characteristics of an organization were not considered to have a direct effect on their employees in perceiving the benefits of knowledge management.

9.2.4 Hypothesis H3b

Contrary to previous technology acceptance studies such as Chiu (2004), Igbaria et al. (1997), as well as Igbaria, Guimaraes and Davis (1995), IT support was found to be positively related to the perceived complexity in this research. Igbaria, Guimaraes and Davis (1995) verified that system characteristics had direct effects on perceived ease of use. To extend Technology Acceptance Model, Igbaria et al. (1997) investigated the external factors of perceived usefulness and perceived ease of use in affecting personal computing acceptance. It was observed that both internal and external computing support directly influenced the uses in perceptions regarding how difficult or easy the system was for them. Moreover, Chiu (2004) conducted a study examining the usage of Learning Management System (LMS) in a context of life insurance company and identified that functional characteristics of LMS had positive impacts on perceived ease of use. Since perceived ease of use has been widely utilized to measure the users' perceptions about information system, this study, aiming at examining the adoption and practice of knowledge management, used "complexity" adapted from Rogers's (1995) innovation theory and suggested that IT support would negatively influence the perceived complexity of knowledge management. However, the findings of this study did not support the proposed

negative influences of information technology support on the perceived complexity among the employees.

The findings were also not in line with the results of the field study. Among the interviews, all participants agreed that the support of new technology and appropriate system would play an imperative role in deciding whether the employees felt that KM was effortless or tricky for them. Nevertheless, it was surprising to find that there was a positive relationship between IT support and perceived complexity in the main survey (γ=0.221, t-value=3.283). One possible explanation is that, for people who have some sort of IT background or concept, IT support such as hardware/software infrastructure and function would help reduce the complexity of knowledge management; however, for the general managers and staff who might have little comprehension regarding information system and technology, more IT support to them might mean more difficult tasks to learn how to use the new software and operate the various functions. Another possible explanation is that, in the case of adopting new technology/system, projecting the appropriate hardware/software and conducting the tests and adjustments, are basically the tasks of the IT persons; nevertheless, in the context of knowledge management adoption and practice, the general employees would need to get much more involved in providing their knowledge/experience as the input of the new technology/system, which would let them feel that KM is relatively bothersome. Accordingly, the life insurance enterprises, or other organizations in embarking on KM, should recognize such a gap that the general employees might not catch up with a new technology or system that is far beyond their capability. Choosing the information technologies which are suitable for the employees to operate might be more important than having those that are too complicated to use and finally become useless.

9.2.5 Hypotheses H4a and H4b

Sharing and using knowledge were somewhat unnatural acts for human beings since knowledge might bring value and opportunity for the individuals (Davenport 1996). Therefore, this study suggested knowledge management promotion to be significant to motivate people to contribute their knowledge and sharing with others. The findings of this study supported the statistical significance of knowledge management

promotion in increasing the perceived usefulness of knowledge management among the employees.

Little research was found in the literature that specifically hypothesized knowledge management promotion as an external factor in influencing perceived usefulness. This study views knowledge management as an innovation and therefore knowledge management adoption and practice can be seen as the process of adoption and diffusion of innovation in an organization. Rogers (1995) has indicated that the process of innovation-decision actually involves five stages from knowledge of an innovation, forming an attitude toward the innovation, decision to adopt or reject, implementation of the new idea to confirmation of the decision. The first knowledge stage commences when an individual or other decision-making unit is exposed to an innovation's existence and gains an understanding of how it functions. Therefore, this study recommended that some promotion regarding knowledge management should be conducted to enlighten the worth of knowledge management prior to the employees forming their attitudes toward such an innovation. The results showed that there was significant statistical verification that the proposed knowledge management promotion had a direct positive impact on the perceived usefulness.

For the construct of knowledge management promotion, the research employed the items that were considered to be essential in persuading individuals to accept and apply knowledge management in organizations. The items were generally acquired from the previous KM research and the field study. Both the literature and the field study identified that KM manager (Davenport 1996; Chait 1999), KM team (Alavi & Leidner 2001), top management support (Brand 1998); Davenport & Glaser 2002), time schedule/guideline (Alavi & Leidner 2001; Chair 1999), participation of the key person in each department (Hung, Mao-Sheng 2003; Liou 2004), knowledge transfer channel (Alavi & Leidner 2001; Wang, Chia-Hung 2002), knowledge type (Alavi & Leidner 2001; Wang, Chia-Hung 2002) and reward for KM (Davenport 1996) represented the relevant aspects in the phase of knowledge management promotion. The participants in the interviews indicated the project of KM, transmitting the mission of KM and having trainings in advance, would help the employees well prepared for adopting and applying knowledge management. The PLS analysis

showed that all items loaded high with the corresponding construct, i.e. knowledge management promotion, and thirteen out of the originally proposed fourteen items passed the threshold of 0.7 in evaluating item reliability.

As elucidated above, this research extended previous studies of technology acceptance and innovation diffusion by proposing knowledge management promotion would negatively affect the perceived complexity of knowledge management. However, the findings of this study (γ=0.070, t-value=0.971) did not statistically support the significance of knowledge management promotion in negatively influencing employees' thoughts regarding the complexity of knowledge management. The rationale could be that, the employees in the life insurance enterprises already had abundant work in their daily jobs; any added tasks, e.g., discussions for having a KM plan/project and the associated training beforehand, would bring to them additional troubles.

Therefore, this study provides practical suggestions as follows. Firstly, the life insurance enterprises can commence knowledge management by proposing a KM plan or project to decide the associated budged and place the appropriated persons to promote such a plan or project. Secondly, a strong support from top management is crucial to keep the conditions for knowledge management to be sustained overtime. Thirdly, there should be clear directives and guidelines for the employees to follow in implementing the management of knowledge. These aspects of knowledge management promotion might greatly raise the recognition among the employees about the value of knowledge management. Nonetheless, it should be noted that too much promotion for knowledge management all at once could make it more complex for the employees in perceiving such a scheme. Hence, organizations should consider their employees' real recognitions about knowledge management, and offer the promotion that is acceptable and understandable for the employees to collaborate in having knowledge management in the organizations. Theoretically, this study indicated that the whole procedures of knowledge management, referring to the process of innovation-decision, should initiate with the knowledge stage, which helps the individuals, including both managers and staff, to recognize the importance of KM and realized how it works during the whole processes.

9.2.6 Hypothesis H5b

Alavi and Leidner (1999) argued that the effect of computer systems would be limited in the lack of an explicit organizational strategy to better create and integrate knowledge in the organization. Lu (2002) and Yeh (2003) reported that organizational factors, e.g., organization learning, would positively affect on acceptance and usage of new systems in the setting of life insurance business. Therefore, it was suggested that organizational characteristics would negatively influence the complexity of knowledge management among the employees. However, the results from the PLS analysis did not support the proposed negative relationship. On the contrary, it was shown that organizational characteristics would positively affect the perceived complexity of knowledge management in the main national survey.

It is noted that, in the PLS analysis, the two items with item loadings more than 0.8 to their respective construct, i.e., organizational characteristics, were vision, value and objective, as well as strategy and policy of an organization. It was anticipated that these characteristics of an organization would help employees in decreasing the associated difficulties of knowledge management for them. However, the findings of this empirical study were not in line with the proposed suggestion. The possible explanation is that the vision/value/objective and strategy/policy could arouse more irritation if they were ambiguous or changing all the times. In the field study, a participant mentioned that his company would have a new "slogan" for each year based on their yearly objective. "We paid some attention to those slogans first, while we would neglect them eventually since we were too busy. We realized that finishing our current jobs were more important than those slogans," he stated. Another possible explanation is that, though it was suggested that larger companies would have more human and financial resources for initiating and carrying on knowledge management activities, they might be more "clumsy" in the processes of diffusing and managing knowledge. Cathay Life Insurance Company, the largest company in Taiwan life insurance industry, had more than 200,000 employees and noticed that it had difficulties in the transmission of information and knowledge (Microsoft, Taiwan 2005).

The findings provide practical implications for the life insurance enterprises in Taiwan that, in order to reduce the complexity and potential obstacles associated with KM, the relevant strategy or policy should be consistent and applicable, and there should be an open structure, in which different opinions and problems can be well shared and communicated. Besides, those life insurance companies with larger size or longer history might need to make more efforts to have knowledge management in their organizations to overcome the problems involved in diffusing knowledge in such big institutions, as well as change the traditional thoughts and methods existing among the employees.

9.2.7 Hypotheses H6a and H6b

The findings of this study supported the significance of cultural factors, as well as their impacts on both perceived usefulness and subjective norm. Therefore, cultural factors were identified to be significant factors in affecting adopting and applying knowledge management to generate sustained competitive advantages (Barney 1986, 1997; Brand 1998; Chait 1999; Chen, Shang-Shing 2003; Gold, Malhotra & Segars 2001; Hung, Hui-Shu 2003; Liou 2004; Nahapiet & Ghoshal 1998).

Besides, as proposed by Rogers (1995) that culture could form the behavior patterns for the members of a social system and thus had influence on innovation diffusions, this study supported that the impact of cultural factors on the subjective norm was statistically significant. Davenport and Prusak (1998) indicated that a knowledge-friendly organizational culture could shape the conditions that eventually led to the success of knowledge management in organizations. In the field study, there was a general agreement among the participants that cultural factors, such as collective culture, trust and commitment, as well as respective culture, would influence the subjective norm which in turn affected the individuals in adopting and implementing knowledge management in the life insurance enterprises.

In probing into the theoretical framework of knowledge management adoption and practice in Taiwan life insurance industry, this study advocated that cultural factors were the external factors that significantly affected people's attitudes and behaviors regarding knowledge acceptance and practice via perceived usefulness (Davis,

Bagozzi & Warshaw 1989) and subjective norm (Rogers 1995). The proposed direct and positive relationships were shown to be supported in the empirical nation-wide survey. These findings were also consistent with the arguments by Chait (1999) that cultural realities could act as enablers for knowledge and several empirical studies in Taiwan that cultural factors played significant roles in the applications of knowledge management strategies and mechanisms (Chen, Shang-Shing 2003; Hung, Hui-Shu 2003; Liou 2004; Yang 2004).

The implications for management are that, culture did play an important role in affecting people's perceptions, particular via perceived usefulness and subjective norm, in adopting and applying knowledge management. To inaugurate knowledge management, the managers could make endeavor to create a knowledge-intensive culture for people to believe that knowledge sharing and actively offering knowledge were encouraged (Davenport & Prusak 1998). The team-work culture was reported to be the essential knowledge management capability required in organizations (Alavi & Leidner 1999). Therefore, the emphasis of team-work would persuade more employees to accept knowledge management since they would need to cooperate with others. Besides, if organizations could actively encourage their employees to explore new things, ask for helps when needed and interact with others in different divisions (Gold, Malhotra & Segars 2001), they would recognize more benefits of knowledge management, and the environment that nourish knowledge sharing and creation could be established in the meantime.

9.2.8 Hypothesis H7

It was observed that perceived usefulness positively influences the attitude toward KM adoption. Ajzen and Fishbein (1980) in the TRA suggested that a person's beliefs regarding certain outcome from the behavior would affect his or her attitude toward the behavior and thus on the behavior. Such beliefs concerning the outcome and its evaluation were identified in TAM as "perceived usefulness", which influenced the attitude toward using a system and the actual system usage (Davis, Bagozzi & Warshaw 1989). This study attempted to examine the relationship from perceived usefulness to the attitudinal factor in a context of KM adoption and practice in Taiwan life insurance industry. The proposed relationship was found to be statistically

significant. The findings of this study were also in line with the previous empirical studies in Taiwan (Liu 2004; Chiu 2001), suggesting that perceived usefulness had impacts via attitudes on the on people's behaviors in using new technologies or a new system.

Both practical and theoretical implications can be acquired from the results. For the managers of the life insurance enterprises, this study suggests that they should enlighten the employees on the worth and significance of knowledge management for them, such as increasing productivity, enhancing efficiency, and making it easier, more convenient and flexible at work, etc., and thus the employees would be more willing to accept knowledge management and realize that applying knowledge management is not only important for the organizations, but also beneficial for themselves. Theoretically, this study provides a comprehensive research model considering a key perceptive factor, i.e., perceived usefulness, and its effects on attitudes for the examination of knowledge management adoption and practice.

9.2.9 Hypotheses H8 and H9

The findings of this study did not support the negative influence of complexity on the attitude toward knowledge management adoption. The value of standardized path coefficient (-0.013) from PLS analysis revealed that the relationship from complexity to attitude was found to be negative. Nevertheless, the relationship was not statistically significant with t-value of 0.239. Though Rogers (1995) suggested that complexity was one of the determinant factors in influence the diffusion of an innovation, its impact on the attitude toward knowledge management acceptance was not found to be significant in this empirical study.

Most of the interviewees in the field study stressed that the complexity of knowledge management would decrease the employees' interests to adopt it. However, the participant on behalf of company A did not agree such an argument. On the contrary, she said that, "as long as KM is useful for me at work, I will try hard to learn it". Her statement seemed to have provided the rationale for the results from the main survey among Taiwan life insurance enterprises. It was implied that when knowledge management was perceived to be useful in improving job performance, the employees

would be willing to overcome any difficulties and accept knowledge management. Actually, some earlier research has questioned the overall significance of perceived ease of use in IT adoption (Keil, Beranek & Konsynski 1995; Gefen & Straub 2000), and indicated that in many cases a new IT was adopted primarily for its perceived usefulness. That is, the users was paying more attention to whether the new IT was instrumental in accomplishing tasks that were not inherent in the use of the IT itself. Therefore, this study provides managerial implications that, though the life insurance enterprise should try to make KM as easy as possible for the employees in adopting and applying KM, the employees cared more about what are the exact benefits that knowledge management can bring to them in their daily tasks.

The proposed negative influence of complexity on perceived usefulness was not supported in this study. This study suggested that complexity negatively influence perceived usefulness based on the previous studies (Adams, Nelson & Todd 1992; Igbaria, Guimaraes & Davis 1995; Szajna 1996), as well as the opinions of the interviews from company A, B, C and D. If the employees could not find the information they needed rapidly, they would be wasting their valuable time and could not acquire, integrate and employ knowledge effectively (Phillips Fox 1998). The participants in the field study also emphasized that, when they were required to spend too much time on learning and applying knowledge management, they would feel that KM was a burden, rather than an aid, for them.

In this empirical study, complexity was found to have a direct effect on perceived usefulness, but the impact of complexity on perceived usefulness was positive, instead of negative (γ=0.127). The possible explanation for such findings can be unearthed from the field study. One interviewee from Company F mentioned that, "if a knowledge management system is not "complicated" enough, it means that it is not satisfactory to deal with the various tasks in practical operations." From the findings of this study, it is interesting to observe that the employees would somewhat assume that, if a knowledge management project/system was too easy to execute or use, it would be a project/system with limited usefulness for not providing adequate functions as required.

9.2.10 Hypothesis H10

Subjective norm was posited to be essential in influencing an individual's behavior in the past research (Ajzen 1991; Ajzen & Fishbein 1980; Davis, Bagozzi & Warshaw 1989; Mathieson 1991; Moore & Benbasat 1991; Taylor & Todd 1995a, 1995b; Thompson, Higgins & Howell 1991). This study extended the notion by indicating that subjective norm had positive impacts on the practice of knowledge management via employees' attitudes toward knowledge management adoption. In the literature, Dishaw and Strong (1999) has presented that social norm played a more significant role in an organizational background. During the field study, all the interviewees agreed that the employees were very likely to be affected by others in adopting and applying knowledge management. They mentioned that the employees in the life insurance industry were working in a very limited space in the office and little segments were provided. Most of them were squeezed in an office and almost everyone could see one another's actions in such environments. It would be hard for them not to be influenced by others' talks and behaviors.

This study identified seven items for subjective norm through the literature (Ajzen 1991; Ajzen & Fishbein 1980; Davis, Bagozzi & Warshaw 1989; Moore & Benbasat 1991; Rogers 1995; Taylor & Todd 1995a, 1995b; Thompson, Higgins & Howell 1991 Venkatesh & Davis 2000) and the field study. The quantitative data analysis revealed that all items loaded high on the corresponding construct. Peer pressure, co-workers' adoption and comments, as well as prestige/profile/status, played considerable roles in shaping the subjective norm among the employees in the life insurance companies. Meanwhile, other four items were found to have item loadings more than 0.8 and they were supervisor, senior management, opinion leader and requirement of the organization. It implied that the influences from these aspects were more significant in reflecting the subjective norm in the life insurance industry in Taiwan. Therefore, the life insurance enterprises could invite more managers to participate in knowledge management projects because their encouragements and opinions would be very important in determining the employees' attitudes toward knowledge management adoption.

9.2.11 Hypothesis H11

This study supported previous research that suggested attitude as a crucial factor in predicting an individual's behavior (Ajzen 1991; Ajzen & Fishbein 1980; Bandura 1986; Engel, Blackwell & Miniard 1986; Carroll & Thomas 1988; Davis 1992; Thompson, Higgins & Howell 1991). According to Ajzen and Fishbein (1980), attitude was defined as an individual's positive or negative evaluation of performing a certain behavior. Davis (1992) suggested enjoyment as the "intrinsic motivation" that had impacts on a person's intention to use computers in the workplace. Moreover, Thompson, Higgins and Howell (1991) referred "affect toward use" to the feelings of joy and pleasure associated by an individual to a specific action, such as utilizing personal computers. This study identified attitude toward knowledge management adoption as the employees' overall affective reaction to the acceptance of knowledge management, and found that such an attitudinal factor did have significant impacts on the employees in implementing the activities related to knowledge management. The corresponding t-value is very high (t = 13.829).

Little empirical research was found in the literature to consider the attitudinal factor in investigating the adoption and applications of knowledge management. This study presented the research framework and associated items for examining the employees' feelings regarding accepting knowledge management. In the field study, attitude was also recognized as the primary factor in deciding a person's performance in knowledge management activities. Several managers highlighted this notion by alleging that, "Attitude decides the height.", which was a saying commonly used in Taiwan. From these managers' experiences, it was believed that a person's attitude would determine his or her behavior in various respects. Therefore, how to increase the employee's interests to accept knowledge management, such as via introducing the benefits of KM (i.e., perceived usefulness) and encouragements from top management (i.e., subjective norm), would be the focal point for the life insurance companies to put knowledge management into place.

9.2.12 Hypothesis H12

Viewing knowledge as the resources that may create long-term sustainable competitive advantages (Alavi & Leidner 2001), the ultimate goal of knowledge

management is to improve the organizational performance. Wu, Chi-Min (2003) reported that knowledge management could enhance the performance of an organization. Gold, Malhotra and Segars (2001) proposed that knowledge management processes had impacts on organizational effectiveness. The findings of this study statistically supported the relationship that knowledge management practice significantly influenced the perceived expected performance for the organization. The corresponding t-value is extremely high (t = 20.341).

Previous studies, such as Davis and Mentzer (2002), Gold, Malhotra and Segars (2001), Hasan and Al-Hawari (2003), Huang (2002), Hung, Mao-Sheng (2003), Kalling (2003), Lin (2001), Massey, Montoya-Weiss and O'Driscoll (2002), Su (2002), Thomas and Keithley (2002), Wang (2004), Wang, Tsai-Pai (2002), Wu, Chi-Min (2003), Wu, Hsin-Ning (2003) and Wu, Chia-Chun (2004), have identified that knowledge management activities had influences on the performance of an organization. However, it was indicated that using financial indicators, e.g., return on investment (ROI) and return on equity (ROE), might be misleading for being confounded by other economic or environmental factors which were uncontrollable (Gold, Malhotra and Segars 2001). Therefore, to look into value-added aspect of knowledge management in an organization, this study identified perceive expected performance by using the following items: customer service, overall operational efficiency, cost down, ability to adapt to changes, reputation and public praise, improving worker's quality, providing information for decision makers, keeping the record of workers' experience in the company, as well as decreasing the impact of turnover. Though some of the items were simply obtained from the field study, the nine items were shown to have considerably high loadings to the corresponding construct.

The results implied that, the more knowledge management was applied, the more expected performance would be perceived for the organization. In other words, the managers and staff would perceive more payback for the organization after they had applied knowledge management for a while. The findings explained why some companies were still hesitating to embark on knowledge management, while others had utilized knowledge management methods to improve their organizational

performance in several aspects. As a result, for the companies which were in the initial stage of knowledge management, to learn from other companies' experiences would be helpful for them to start such initiatives. Besides, the benefits for the organization can be presented by using the indicators, such as improving customer service, enhancing organizational efficiency and saving the costs, to persuade the top management to promote the activities associated with knowledge management. Consequently, there would be more life insurance enterprises that could see the value of knowledge management and commence on their investments on knowledge management.

9.3 Summary

This chapter presented the interpretations of the results of PLS analysis for the comprehensive research model of knowledge management adoption and practice. The findings of the nation-wide survey among Taiwan life insurance industry were discussed according to the suggested hypotheses in this study.

The results of this study generally supported the structure of the grounding theories, including the Theory of Reasoned Action (TRA) (Ajzen & Fishbein 1980), Technology Acceptance Model (TAM) (Davis 1986) and Innovation Diffusion (ID) (Rogers 1995), with the extension of external factors and perceived expected performance that were considered essential in examining the adoption and applications of knowledge management. Among the eighteen research hypotheses, the supported relationships as proposed were as follows: Environments and Industrial Factors to Perceived Usefulness, Individual Characteristics to Attitude toward KM Adoption, KM Promotion to Perceived Usefulness, Cultural Factors to Perceived Usefulness, Cultural Factors to Subjective Norm, Perceived Usefulness to Attitude toward KM Adoption, Subjective Norm to Attitude toward KM Adoption, Attitude toward KM Adoption to KM Practice, and KM Practice to Perceived Expected Performance. Overall, the influences from the environments and some specific features of the life insurance industry were shown to have positive impacts on employees' opinions regarding the usefulness of knowledge management. There was also found to be a direct positive relationship between personal characters and the attitudinal factor. Besides, the promotion of knowledge management before

implementing it would significantly influence the employees' in perceiving the benefits that knowledge management could bring to them. Particularly, cultural factors were indicated to have significant positive influences on both perceived usefulness and subjective norm. The positive influences of perceived usefulness and subjective norm on the attitudinal factor were also confirmed. However, the influence of complexity on the attitude toward knowledge management adoption was found to be insignificant in this study. Finally, the attitude toward adopting knowledge management was shown to have significant effects on the practice of knowledge management, which in turn would affect the perceived expected performance for the organization.

The possible explanations for the nine hypotheses that were not supported in this study were provided. Although the expected significant relationships between complexity and other model variables were not supported in this study, it was found in this research that individual characteristics, information technology support, as well as organizational characteristics would have significant and positive impacts on complexity. These findings were considered helpful in probing the potential obstacles in causing the difficulties in knowledge management adoption and practice, particularly in the setting of Taiwan life insurance industry, as well as providing the cues for future research in exploring the role of complexity in the processes of adopting and implementing knowledge management. Therefore, the construct of complexity is retained in the research model. The items used in reflecting the associated constructs in the research model were discussed through the findings from this empirical study. In the last chapter, this thesis will conclude by presenting the summary of the research, its contributions and limitations, as well as the directions provided for future research.

Chapter 10 CONCLUSIONS, LIMITATIONS AND FUTURE RESEARCH

10.1 Introduction

This chapter aims to summarize the current study and offer suggestions for future research. The first section presents a summary of the findings of this study. This is followed by a discussion of the contributions of this study to the body of knowledge relating not only to the perceptions concerning knowledge management, but also the overall knowledge in the field of knowledge management adoption and practice in the life insurance business. The limitations involved in the research are also discussed. Finally, this chapter concludes with future research directions.

10.2 Summary of Research Findings

The current research on knowledge management was identified as having a gap, namely in identifying the factors affecting the adoption and practice of knowledge management among the life insurance enterprises. This study developed a tentative research model that extended the TRA, TAM and ID models, as well as incorporated relevant factors sourced from the empirical knowledge management research in Taiwan. The constructs and factors of the preliminary research model, proposed

from the comprehensive literature review, were validated and enhanced by a qualitative field study.

The field study involved ten interviews with key persons in six life insurance companies in Taiwan. Using a semi-structured interview protocol, the data collected from the field study were analyzed through content analysis approaches. 12 Factors and 93 unique variables were identified in this phase. Individual adoption and practice models for six companies were developed first and combined with tentative research model and thus the comprehensive research model of knowledge management adoption and practice was produced.

The final research model consisted of external factors, perceptive factors, attitude, knowledge management practice and perceived performance for the organization. The framework of the external factors, perceptive factors and attitude was developed by incorporating the suggestions of the TRA, TAM and ID. The contents of the external factors was further identified, and the activities involved in applying knowledge management along with their influences on the performance recognized for the organization were added, utilizing relevant studies especially in the field of knowledge management. The measures of the factors used in this study were mostly sourced from the previous TRA, TAM, ID and knowledge management studies, whereas theses measures and some unique factors with their measuring items were assured via the field study to be more appropriate to be used in the current research.

In the second phase, a questionnaire was developed base on the combined research model. The initial research questionnaire was further examined via back-translation, pretest and a pilot test. The layout and contents of the questionnaire were slightly revised according to the feedbacks obtained from the above procedures. Adequate reliability was obtained by analyzing the data collected from the pilot study. The results in this phase proved the effectiveness of the questionnaire.

A nation-wide survey was conducted in the last phase. The main survey was administered among the life insurance enterprises in Taiwan. The research

questionnaire was distributed to 605 employees of Taiwan life insurance industry and 362 valid responses were returned, thus yielding the effective response rate of 59.8%. Partial Least Squares (PLS) based Structural Equation Modeling (SEM) was applied to analyze the main survey data. The properties of the items and constructs, as well as the significance of the proposed relationships in the PLS model were examined. The results indicated that the item reliability, internal consistency and discriminant validity were relatively satisfactory in the comprehensive research model of knowledge management adoption and practice. Overall, the research model explained 52.1% of the variance in the perceived expected performance for the organization. The results of the hypothesis testing were mixed. Nine suggested relationships were found to be statistically significant, while the other nine were not supported at the confidence level of 0.5. The following proposed relationships were supported: Environments and Industrial Factors to Perceived Usefulness, Individual Characteristics to Attitude toward KM Adoption, KM Promotion to Perceived Usefulness, Cultural Factors to Perceived Usefulness, Cultural Factors to Subjective Norm, Perceived Usefulness to Attitude toward KM Adoption, Subjective Norm to Attitude toward KM Adoption, Attitude toward KM Adoption to KM Practice, as well as KM Practice to Perceived Expected Performance. On the other hand, the positive influences of individual characteristics, information technology support and organizational characteristics on perceived usefulness were not found to be significant. The proposed negative relationships between individual characteristics and complexity, information technology support and complexity, knowledge management promotion and complexity, organizational characteristics and complexity, complexity and perceived usefulness, as well as complexity and attitude toward knowledge management adoption were not supported in this study.

The following section presents the significant contributions that the findings of this study make to the knowledge regarding the adoption and appliance of knowledge management, especially for the life insurance business.

10.3 Contributions

This study provides an insight into the factors that affect the adoption and practice of knowledge management, in particular among Taiwan life insurance industry. This

study tested a comprehensive research model that was developed from the literature review and further enriched via a qualitative field study. The comprehensive research model was unique in that it extended well-established TRA and TAM models to the applications of knowledge management, and explored the adoption and diffusion of an innovation, such as knowledge management, in the context of life insurance business. The TRA, TAM and ID were utilized as the theoretical background and the research model incorporated the factors that were specific to the adoption and implementation of knowledge management, particularly for life insurance enterprises. Therefore, this study contributes significantly to the existing literature, as there has been little evidence found in the literature in explaining the adoption and applications of knowledge management in the life insurance industry.

This study identified the external factors that influenced the practice of knowledge management via employees' perceptions and attitudes. These external factors were distinctive in predicting the adoption and applications of knowledge management among the life insurance enterprises. For example, the rules and regulations specific for the life insurance business were identified as the external variables that could affect the acceptance and implementation of knowledge management in the life insurance industry. Furthermore, given that the products sold by the life insurance business were usually "invisible" and the knowledge involved was naturally "implicit", knowledge management promotion played an important role in arousing the staff and managers' recognitions on the benefits of knowledge management. This study exploited the perceptive and attitudinal factors in influencing the individuals' conducting the activities related to knowledge management. The suggested perceived usefulness and subjective norm were shown to have significant impacts on the employees' attitudes toward knowledge management adoption, which in turn affected the practice of knowledge.

Viewing knowledge as a significant resource for the life insurance business, this study attempted to discover the value of managing knowledge for the organization. Knowledge management has been identified essential for an organization to enhance long-term strengths (Chourides, Longbottom & Murphy 2003), improve the workforce (Zhao & Bryar 2001) and increase the core competency (Wu, Chi-Min

2003). Though Taiwan life insurance industry has just initiated to adopt and apply knowledge management for very few years, the findings of this study reveal that the employees believe that the practice of managing knowledge could improve the organizational performance in several aspects, such as service quality, operation efficiency and image of the organization.

For the organizations, especially those life insurance enterprises, launching into the adoption of knowledge management or currently implementing knowledge management, this study presents a better understanding of the significant factors and variables that affect the employees in forming their perceptions regarding knowledge management, their attitudes toward its adoption and their accordance with the organization in conducting knowledge management activities. Since knowledge management usually requires investment of labor and money (Davenport 1996), organizations would need incentives, e.g., that managing knowledge could enhance employees' job performances and thus improve the organizational performance, for them to adopt and implement knowledge management. This study was carried out through both qualitative and quantitative approaches. The life insurance enterprises would find this study useful in providing them with these incentives to employ knowledge management, as well as indicating the possible impediments involved in adopting and applying knowledge management.

The empirical survey among Taiwan life insurance enterprises reveals that complexity does not significantly affect the employees in accepting knowledge management. It is the other two perceptive factors, i.e., perceived usefulness and subjective norm, that significantly influence the managers and staff in deciding whether they would accept knowledge management or not. Therefore, the life insurance enterprises could actively enlighten the worth and significance of knowledge management for the individuals in improving their job performance by proper promotion, e.g., showing them how knowledge management can save their time and give them more flexibility at work. Besides, to create an environment in which sharing knowledge and making efforts on managing knowledge are highly motivated would be imperative to put knowledge management into place. Particularly for those life insurance enterprises in Taiwan, the opinions from

supervisors, senior managers and opinions leaders are deemed significant in reflecting the subjective norm regarding knowledge management adoption and practice.

Further, this study suggests that organizational competitive competency would be increased effectively by the adoption and applications of knowledge management at both individual and organizational levels. It is found that knowledge management practice would have a positive impact on the perceived performance for the organization. It implies that the value of knowledge management for the organization would not be unearthed until knowledge management is employed practically and reaches the stage of maturity. This study offers the managers with a picture of the processes involved in adopting and applying knowledge management in the life insurance business, as well as presents the benefits of managing knowledge for both individuals and organizations.

10.4 Limitations

However, there were some limitations involved in this study. The results of the current study should be interpreted cautiously due to these possible limitations. In regard to methodological issues, the sampling method might be of concern firstly. The selection of the participant companies and the samples were not purely random. As explained in the research methodology section, the companies taking part in the field study were selected based on convenience sampling. In the main survey, the approach of cross-sectional approach was utilized to select the life insurance companies representing various segments of Taiwan life insurance industry. Although the contact persons were requested to randomly select the sample across departments and divisions, there could be some risk of sample bias.

Another concern in the research methodology was the possibility of biased answers regarding the practice of knowledge management in certain departments and sections. Even though the researcher had asked for the assistance of the contact persons to distribute the questionnaire randomly in different departments and divisions, the researcher had no control over the evenness or otherwise of their distribution. In the processes of the field study, some interviewees mentioned that the pattern and

level of applying knowledge management would be different in various departments, in which dissimilar tasks were involved. For example, the workers in the administration sections with main tasks to print and bind the insurance policies would not feel the same merits of utilizing knowledge as those who worked in the underwriting divisions in which a variety of professional knowledge and information were required to deal with different cases.

A third issue of concern was related to the cultural bias in the current research. The original research instrument was developed in English and it was required to be translated into Chinese that was comprehensible for the people in Taiwan. While some efforts were made to reduce the risk of problems by the use of back-translation and pretest, there still remained the risk of problems involved in the differences of language and culture, thus affecting the psychometric properties of the instruments.

Fourth, the life insurance enterprises in Taiwan have simply initiated to adopt and apply knowledge management in recent years. Difference stages were involved in the adoption and implementation among the life insurance companies in Taiwan. During the field study, the interviewees expressed that knowledge management had become a trend and drawn much attention in Taiwan life insurance industry. However, they mentioned that, some companies might still hesitate to put knowledge management into place in their organizations and others utilized some methods of managing knowledge while not explicitly using the terminology of knowledge management. Although the research questionnaire was developed in such a way that the respondents were provided with the definitions of knowledge and knowledge management and the questions were expressed as simple as possible, some respondents might not be able to give their real opinions for having little understanding or experience of knowledge management. Therefore, the use of an oral instruction before distributing the questionnaire would be preferable, wherever possible.

Lastly, the conclusions reached in the current study were not of universal applications since the research was conducted in the context of life insurance business in Taiwan. This limited the generalizability of the findings of the current

study to different geographical contexts and other industry sectors. However, some adjustments, e.g., adaptation of the environments and industrial factors, as well as revision of the meaning of perceived usefulness, could be made to apply the findings of this study in other financial industries, such as banking and composite financial enterprise. The results of this research might be generalized through further examination and testing in other countries.

10.5 Future Research Directions

This study basically tested the entire comprehensive research model. In the future research, parts of the research model can be extracted and investigated. For example, the role of "cultural factors" can be tested to examine their impact on "perceived usefulness" and "subjective norm" parts of the knowledge management adoption and practice. In the same way, other parts of the combined model can be tested as well. Knowledge management practice was identified in this study as the activities and processes involved in applying knowledge management. A separate study can also be undertaken to investigate their sequences in detail and further test these processes. Moreover, some directions based on other theories, e.g., PZB model (Parasuraman, Zeithaml & Berry 1985, 1988), can be added to adjust this research model. For instance, the relationship between knowledge management applications and service quality can be investigated.

The focus of this study was on the factors affecting the adoption and practice of knowledge management in the life insurance industry in Taiwan. This raised the issue that different levels of adoption and applications might have impacts on the employees' perceptions regarding knowledge management. Hence, an evaluation of the adoption and implementation of knowledge management among Taiwan life insurance enterprises would be important in providing a better understanding of the applications of knowledge management in the life insurance business in Taiwan. Further work could be conducted to further investigate the actual knowledge management projects and relevant schemes/systems employed among the life insurance enterprises.

Further, this study only reflects and measures the snapshot situation of knowledge

management adoption and applications at a particular point in time. The prospective studies can undertake longitudinal research to investigate the influences of applying knowledge management on the organizational performance.

As the main survey in this study involved a nation-wide investigation among the life insurance enterprises in Taiwan, the information regarding the participant companies, such as size, history and type was not requested for not causing any discomfort or ambiguity for the respondents. Further research can be conducted to examine the impact of organizational size, category and location on their adopting and implementing of knowledge management. Besides, what would be the effects of the individual characteristics, such as education, gender, age, position and job domain, on a person's behavior in implementing knowledge management is worth further investigation.

As previously noted, the context of this study was the life insurance industry in Taiwan. The validity of the research model for the adoption and practice of knowledge management could be further examined in the non-profit life insurance organizations or non-life insurance sectors. The prospective studies can also adapt this research model as a theoretical basis, to investigate the adoption and practice of knowledge management in other financial industries. Finally, the applications of the research model can be extended via looking into a broad region such as Asia or investigating in the international setting.

10.6 Summary

This study confirmed the significance of the relationship posited by the TRA model, in which a positive perception of the benefits translated into a positive attitude, which in turn affected their behaviors in conducting knowledge management activities. The results also supported that perceive usefulness and subjective norm, which were the perceptive factors adapted from the TRA, TAM and ID, had significant influences on the practice of knowledge management via the employees' attitudes toward adopting knowledge management. To extend the existing theories, this study identified environments and industrial factors, individual characteristics, information technology support, knowledge management promotion, organizational

characteristics and cultural factors, as the external factors that affected the perceptive factors in the context of knowledge management adoption and practice. The role of these external factors in influencing the perceptions regarding knowledge management produced the following mixed results. Environments and industrial factors, knowledge management promotion and cultural factors were found to have positive influences on perceived usefullness. Cultural factors were also shown to have significant positive effects on subjective norm. On the other hand, the positive influences of individual characteristics, information technology support and organizational characteristics on perceived usefulness, as well as the negative impacts of individual characteristics, information technology support, knowledge management promotion and organizational characteristics on complexity were not accepted statistically in this study. These results implied that the life insurance enterprises could recruit suitable personnel, provide sufficient IT support and create a knowledge-favored culture to increase the employees' awareness about the benefits of knowledge management. Overall, given that some difficulties might be involved in the processes, when the employees could well recognized the worth of managing knowledge for them, and there was a consensus reached in the organization that knowledge management was imperative and beneficial, they would tent to have positive attitudes toward knowledge management adoption, actively conduct the associated activities, and thus it could be anticipated that organizations would improve its performance via knowledge management schemes or mechanisms

In terms of the limitations of this study, there were some potential weakness in the research methodology issues and generalizing the results of the current study to other industry sectors or geographical contexts. Although the cross-sectional approach was employed in the main survey to select the participant companies that can reflect the various segments of Taiwan life insurance industry, there was a risk that the samples were not purely random. Another concern was the cultural bias involved in this study. Even as the efforts were made via back-translation and pretest to reduce the potential problems in the disparities of language and culture, there still remained the issue of cultural bias possibly embedded in the current study. Moreover, since the setting of this study was the life insurance industry in Taiwan, some adjustments should be made to generalize the findings of this research to other industrial and

geographical contexts.

The study provides the future research with several directions. It is suggested that parts of the comprehensive research model can be extracted and further investigated. The actual adoption and implementation of knowledge management among the life insurance enterprises can be further examined via exploring their associated systems or projects. Meanwhile, since the current study only reflected the adoption and applications of knowledge management adoption and applications at a particular point in time, longitudinal studies were required to better examine the differences between adopting/applying and not adopting/applying knowledge management. Furthermore, there is a need to develop an advanced assessment of the impacts of applying knowledge management on the organizational performance. Further examination of the research model is anticipated in the non-profit life insurance organizations, non-life insurance sectors and other financial industries. The validity of the research model can also be further tested in a broad geographic context.

Above all, while there were some research limitations as described above, this study would have significant contributes theoretically and practically. This study offers a comprehensive research model for future knowledge management studies, as well as managerial implications for life insurance enterprises, particularly those embarking on knowledge management in Taiwan, with a better understanding of the determinant factors in adopting/applying knowledge management and the guidelines to successfully put knowledge management into place in their organizations.

References

Adams, D. A., Nelson, R. P. & Todd, P. A. 1992, 'Perceived usefulness, ease of use, and usage of information technology: a replication', *MIS Quarterly,* vol. 16, no. 2, pp. 227-247.

Adler, N. J. 1984, 'Understanding the ways of understanding: cross-cultural management methodology reviewed', *Advances in International Comparative Management*, vol. 1, pp. 31-67.

Agarwal, R. & Prasad, J. 1997, 'The role of innovation characteristics and perceived voluntariness in the acceptance of information technologies', *Decision Sciences,* vol. 22, no. 3, pp. 557-582.

Agarwal, R. & Prasad, J. 1998a, 'A conceptual and operational definition of personal innovativeness in the domain of information technology', *Information Systems Research,* vol. 9, no. 2, pp. 204-215.

Agarwal, R. & Prasad, J. 1998b, 'The antecedents and consequents of user perceptions in information technology adoption', *Decision Support Systems,* vol. 22, no. 1, pp.15-29.

Agarwal, R. & Prasad, J. 1999, 'Are individual differences germane to the acceptance of new information technologies', *Decision Sciences,* vol. 22, no. 3, pp. 557-582.

Agarwal, R. & Prasad, J. 2000, 'A field study of the adoption of software process innovations by information systems professionals', *IEEE Transaction on Engineering Management,* vol. 47, no. 3, pp. 295-308.

Ahmed, P. K., Lim, K. K. & Loh, A. Y. E. 2002, *Learning Through Knowledge Management,* Butterworth-Heinemann, Oxford, UK.

Ahn, J. H. & Chang, S. G. 2004, 'Assessing the contribution of knowledge to business performance: the KP3 methodology', *Decision Support Systems,* vol. 36, pp. 403-416.

Ajzen, I. & Fishbein, M. 1975, *Belief, Attitude, Intention and Behavior: an Introduction to Theory and Research,* Addison-Wesley, Reading, MA.

Ajzen, I. & Fishbein, M. 1980, *Understanding Attitudes and Predicting Social Behavior*, Prentice-Hall, Englewood Cliffs, NJ.

Ajzen, I. 1991, 'The theory of planned behavior', *Organizational Behavior and Human Decision Processes,* vol. 50, no. 2, pp. 179-211.

Alavi, M. & Leidner, D. E. 1999, 'Knowledge management systems: issues, challenges, and benefits', *Communications of the AIS,* vol. 1, no. 7, pp. 1-37.

Alavi, M & Leidner, DE 2001, 'Review: knowledge management and knowledge management systems: conceptual foundations and research issues', *MIS Quarterly,* vol. 25, no. 1, pp. 107-146.

Al-Khaldi, M. A. & Wallace, R. S. 1999, 'The influence of attitudes on personal computer utilization among knowledge workers: the case of Saudi Arabia', *Information & Management,* vol. 36, no. 4, pp. 185-204.

Allee, V. 1998, '12 principles of knowledge management', Retrieved August 30, 2006, from: http://www.astd.org/astd/Resources/performance_improvement_community/principles.htm.

Almeida, P. 1996, 'Knowledge sourcing by foreign multinationals: patent citation analysis in the U.S. semiconductor industry', *Strategic Management Journal,* vol. 17, Winter, pp. 155-165.

Alreck, P. L. & Settle, R. B. 1995, *The Survey Research Handbook – Guidelines and Strategies for Conducting a Survey*, 2nd edn, Irwin, Chicago.

American Productivity & Quality Center, 1999, 'Executive summary of knowledge management', *Best-Practice Report,* Retrieved May 5, 2007, from: http://www.apqc.org/portal/apqc/ksn?paf_gear_id=contentgearhome&paf_dm=full&pageselect=detail&docid=100820.

Appleyard, M. M. 1996, 'How does knowledge flow? Interfirms patterns in the semiconductor industry', *Strategic Management Journal,* vol. 17, Winter, pp. 137-154.

Babbie, E. 2001, *The Practice of Social Research*, 9th edn, Wadsworth Publishing, Belmont, CA.

Bandura, A. 1982, 'Self-Efficacy mechanism in human agency', *Amer. Psychologist*, vol. 37, pp. 122-147.

Bandura, A. 1986, S*ocial Foundations of Thought and Action: a Social Cognitive Theory,* Prentice Hall, Englewood Cliffs, NJ.

Bank of Taiwan 2007, 'Exchange Rate', Retrieved October 30, 2007, from: https://ebank.bot.com.tw/.

Baptista, R. 1999, 'The diffusion of process innovation: a selective review', *International Journal of the Economics of Business*, vol. 6, no. 1, pp. 107-129.

Barclay, D, Higgins, C. & Thompson, R. 1995, 'The Partial Least Squares (PLS) approach to causal modeling: personal computer adoption and use as an illustration', *Technology Studies,* vol. 2, no. 2, pp. 285-309.

Barney, J. B. 1986, 'Organizational culture: can it be a source of sustained advantage?', *Academy of Management Review,* vol. 11, no. 3, pp. 656-665.

Barney, J. B. 1991, 'Firm resources and sustained competitive advantage', *Journal of Management,* vol. 17, no. 1, pp. 99-120.

Barney, J. B. 1997, *Gaining and Sustaining Competitive Advantage*, Addison-Wesley, Reading, MA.

Bassi, L. J. 1997, 'Harnessing the power of intellectual capital', in *The Knowledge Management Yearbook 1999-2000*, J. W. Cortada & J. A., Woods (eds), Butterworth-Heinemann, Wobum, CA, USA, pp. 422-431.

Beatty, R. C., Shim, J. P. & Jones, M. C. 2001, 'Factors influencing corporate website adoption: a time-based assessment', *Information & Management,* vol. 38, no. 6, pp. 337-354.

Becerra-Fernandez, I. & Sabherwal, R. 2001, 'Organizational knowledge management: a contingency perspective', *Journal of Management Information Systems,* vol.18, no. 1, pp. 23-55.

Bednar, C. 1998, 'Capturing and packaging knowledge', in *The Knowledge Management Yearbook 1999-2000*, J. W. Cortada & J. A., Woods (eds), Butterworth-Heinemann, Wobum, CA, USA, pp. 211-220.

Belassi, W. & Fadlalla, A. 1998, 'An integrative framework for FMS diffusion', *Omega,* vol. 26, no. 6, pp. 699-713.

Berg, B. L. 2004, *Qualitative Research Methods for the Social Sciences*, Pearson Education, Inc.

Berreby, D. 1999, 'The hunter-gatherers of the knowledge economy', in *The Knowledge Management Yearbook 2000-2001*, J. W. Cortada & J. A., Woods (eds), Butterworth-Heinemann, Wobum, CA, USA, pp. 70-79.

Bharadwaj, A. S. 2000, 'A resource-based perspective on information technology capability and firm performance: an empirical investigation', *MIS Quarterly,* vol. 24, no. 1, pp. 169-196.

Birkinshaw, J. 1999, 'Acquiring intellect: managing the integration of knowledge intensive acquisition', in *The Knowledge Management Yearbook 2000-2001*, J. W. Cortada & J. A., Woods (eds), Butterworth-Heinemann, Wobum, CA, USA, pp. 108-120.

Blackler, F. 1995, 'Knowledge, knowledge work and organization: an overview and interpretation', *Organization Studies,* vol. 16, no. 6, pp. 1021-1046.

Blumentritt R. & Johnston, R. 1999, 'Towards a strategy for knowledge management', *Technology Analysis and Strategic Management,* vol. 11, no. 3, pp. 287-300.

Boland, R. J. & Tenkasi, R. V. 1995, 'Perspective making and perspective taking in communities of knowing', *Organization Science,* vol. 6, no. 4, pp.350-372.

Bollen, K. & Lennox, R. 1991, 'Conventional Wisdom on Measurement: a Structural equation Perspective', *Psychological Bulletin,* vol. 110, no. 2, pp. 305-314.

Bollinger, A. S. & Smith, R. D. 2001, 'Managing organizational knowledge as a strategic asset', *Journal of Knowledge Management,* vol. 5, no. 1, pp. 1-8.

Bonner, D. 2000, *In Action: Leading Knowledge Management and Learning*, ASTD, Alexandria, Virginia.

Brand, A. 1998, 'Knowledge management and innovation at 3M', *Journal of Knowledge Management*, vol. 2, no. 1, pp. 17-22.

Brinberg, D. & Durand, J. 1983, 'Eating at fast-food restaurants: an analysis using two behavioral intention models', *Journal of Applied Social Psychology*, vol. 13, no. 6, pp. 459-472.

Brislin, R. W. 1993, *Understanding Culture's Influence on Behavior*, Harcourt Brace College Publishers, Orlando.

Brooking, A. 1999, *Corporate Memory: Strategies for Knowledge Management,* International Thomas Business Press, London, UK.

Brown, J. & Duguid, P. 1998, 'Organizing knowledge', *California Management Review*, vol. 40, no. 3, pp. 90-111.

Burton-Jones, A. 1999, *Knowledge Capitalism: Business, Work, and Learning in the New Economy*, Oxford University Press, New York, USA.

Carayannis, E. G. 1999, 'Fostering synergies between information technology and managerial and organizational cognition: the role of knowledge management', *Technovation*, vol. 19, no. 4, pp. 219-233.

Carlsson, S. A. 2001, 'Knowledge management in network contexts', in *9th European Conference on Information Systems*, Bled, Slovenia.

Carlsson, S. A., EI Sawy, O. A., Eriksson, I. & Raven, A. 1996, 'Gaining competitive advantage through shared knowledge creation: in search of a new design theory for strategic information systems', in *Proceedings of the Fourth European Conference on Information Systems,* J. Dias Coelho, T. Jelassi, W. Konig, H. Krcmar, R. O. Callaghan & M. Saaksjarvi (eds.), Lisbon.

Carmines, E. G. & Zeller, R. A. 1981, *Reliability and Validity Assessment,* Sage, Beverly Hills.

Carroll, J. M. & Thomas, J. C. 1988, 'Fun', *SIGCHI Bulletin*, vol. 19, pp. 21-24.

Carter, Jr., F. J., Jambulingam, T., Gupta, V. K. & Melone, N. 2001, 'Technological innovations: a framework for communicating diffusion effects', *Information &*

Management, vol. 38, no. 5, pp. 277-287.

Chait, L. P. 1999, 'Creating a successful knowledge management system', *The Journal of Business Strategy,* vol. 20, no. 2, pp. 23-26.

Chang, Hsiao-Wen 2002, *Knowledge Management and Employee Satisfaction - the Case Study of BNHI Southern Bureau* (in Chinese), Masters thesis, National Cheng Kung University, Taiwan.

Chau, P. Y. K. & Tam, K. Y. 1997, 'Factors affecting the adoption of open systems: an exploratory study', *MIS Quarterly,* vol. 21, no. 1, pp. 1-24.

Chau, P. Y. K. 1996, 'An empirical assessment of a modified technology acceptance model', *Journal of Management Information Systems*, vol. 13, no. 2, pp. 185-204.

Chen, Shang-Shing 2003, *Relationships among Knowledge Management Mechanisms, Corporate Culture and Organizational Innovation* (in Chinese), Masters thesis, Providence University, Taiwan.

Chen, Shih-Wen 2003, *A study of Interactive Decision Support System for Purchasing Variable Insurance*, Masters thesis, Fu Jen Catholic University, Taiwan.

Chengalur-Smith, I. & Duchessi, P. 1999, 'The initiation and adoption of client-server technology in organizations', *Information & Management,* vol. 35, no. 2, pp. 77-88.

Chien, Yueh-Hsiu 2003, *Ontology Based CRM for Life Insurance Company*, Masters thesis, National Chengchi University, Taiwan.

Chin, W. W. & Newsted, P. R. 1999, 'Structural equation modeling analysis with small sample using partial least squares', in *Statistical Strategies for Small Sample Research*, R. H. Hoyle (eds), Sage Publication, Inc., Thousand Oaks, California, pp. 307-341.

Chin, W. W. 1998, 'The Partial Least Squares approach to structural equation

modeling', in *Modern Methods for Business Research*, G. A. Marcoulides (eds), Lawrence Erlbaum Associates, Inc., Mahwah, NJ, pp. 295-336.

Chiu, Hung-Chi 2004, *Trainers' Attitude toward Learning Management System - a Case Study of an Insurance Company* (in Chinese), Masters thesis, I-Shou University, Taiwan.

Chou, T. 2001, *An Investigation of Association between Knowledge Management Activities and Management Performance of Major Corporations in Taiwan* (in Chinese), Masters thesis, National Taiwan University, Taiwan.

Chourides, P., Longbottom, D. & Murphy, W. 2003, 'Excellence in knowledge management: an empirical study to identify critical factors and performance measures', *Measuring Business Excellence,* vol. 7, no. 2, pp. 29-45.

Christie, B. 1981, *Fact to File Communication: a Psychological Approach to Information Systems*, John Wiley & Sons, New York, USA.

Clarke, J. and Turner, P. 2004, 'Global competition and the Australian biotechnology industry: developing a model of SMEs knowledge management strategies', *Knowledge and Process Management,* vol. 11, no. 1, pp. 38-46.

Cohen, S. 1998, 'Knowledge management's killer map', in *The Knowledge Management Yearbook 1999-2000*, J. W. Cortada & J. A., Woods (eds), Butterworth-Heinemann, Wobum, CA, USA, pp. 394-403.

Cole, R. E. 1998, 'Introduction', *California Management Review,* vol. 40, no. 3, pp. 15-21.

Collins, H. 1993, 'The Structure of Knowledge', *Social Research,* 60, pp. 95-116.

Comeau-Kirschner, C. & Wah, L. 2000, 'Who has the time to think', in *The Knowledge Management Yearbook 2000-2001*, J. W. Cortada & J. A., Woods (eds),

Butterworth-Heinemann, Wobum, CA, USA, pp. 22-33.

Compeau, D. & Higgins, C. A. 1995, 'Computer self-efficacy: development of a measure and initial test', *MIS Quarterly*, vol. 19, no. 2, pp. 189-211.

Compeau, D., Higgins, C. A. and Huff, S. 1999, 'Social cognitive theory and individual reactions to computing technology: a longitudinal study', *MIS Quarterly*, vol. 23, no. 2, pp. 189-211.

Cool, K., Dierickxx. I. & Jemison, D. 1989, 'Business strategy, market structure and risk-return relationships: a structural approach', *Strategic Management Journal*, vol. 10, no. 6, pp. 507-522.

Cooper, D. R. & Emory, C. W. 1995, *Business Research Methods,* 5th edn, Irwin, Chicago.

Cortada, J. W. & Woods, J. A. 2000, Eds. *The Knowledge Management Yearbook 2000-2001*, Butterworth Heinemann, Boston, USA.

Cranfield University, 1998, 'The Cranfield/information strategy knowledge survey: Europe's state of the art in knowledge management', *The Economist Group.*

Creswell, J. W. 2003, *Research Design: Qualitative and Quantitative, and Mixed Methods Approaches*, 2nd edn, Sage. Thousand Oaks, California.

Crotty, M. 1998, *The Foundations of Social research: Meaning and Perspective in the Research Process*, Allen & Unwin, Sydney, Australia.

Daal, B. V., Hass, M. & Weggeman, M. 1998, 'The knowledge matrix; a participatory method for individual knowledge gap determination', *Knowledge and Process Management,* vol. 5, no. 4, pp. 255-263.

Davenport, T. & Klahr, P. 1998, 'Managing customer support knowledge', *California*

Management Review, vol. 40, no. 3, pp. 195-208.

Davenport, T. H. & Glaser J. 2002, 'Just-in-time delivery comes to knowledge management', *Harvard Business Review*, July, pp. 107-111.

Davenport, T. H. & Prusak, L. 1998, *Working Knowledge: How Organizations Manage What They Know*, Harvard Business School Press, Boston.

Davenport, T. H. 1996, 'Some principles of knowledge management', Retrieved March 8, 2005, from: http://www.mccombs.utexas.edu/kman/kmprin.htm.

Davenport, T., DeLong, D. & Beers, M. 1998, 'Successful knowledge management projects', *Sloan Management Review*, vol. 39, Winter, pp.43-57.

Davenport, T., Jarvenpaa, S. & Beers, M. 1996, 'Improving knowledge work processes', *Sloan Management Review*, vol. 37, Summer, pp. 53-65.

Davis, D. F. & Mentzer, J. T. 2002, 'Organizational climate, knowledge management, and performance: an integrative framework', *American Marketing Association,* vol. 13, pp. 298-299.

Davis, D. F. 1986, *A Technology Acceptance Model for Testing New End-User Information Systems: Theory and Results*, PhD thesis, Massachusetts Institute of Technology.

Davis, D. F. 1989, 'Perceived usefulness, perceived ease of use, and user acceptance of information technology', *MIS Quarterly,* vol. 13, no. 3, pp. 319-340.

Davis, D. F. 1993, 'User acceptance of information technology: system characteristics, user perceptions and behavioral impacts', *International Journal of Man-Machine Studies,* vol. 38, no. 475-487.

Davis, D. F., Bagozzi, R. P. & Warshaw, P. R. 1989, 'User acceptance of computer

technology: a comparison of two theoretical models', *Management Science,* vol. 35, no. 8, pp. 982-1002.

Davis, D. F., Bagozzi, R.P. & Warshaw, P.R. 1992, 'Extrinsic and intrinsic motivation to use computers in the workplace', *Journal of Applied Social Psychology,* vol. 22, no. 14, pp. 1111-1132.

Deacon, D., Bryman, A. & Fenton, N. 1998, 'Collision or collusion? A discussion of the unplanned triangulation of quantitative and qualitative research methods', *International Journal of Social Research Methodology*, vol. 1, no. pp. 47-64.

Delaney, J. T. & Huselid, M. A. 1996, 'The impact of human resource management practices on perceptions of organizational performance', *Academy of Management Journal*, vol. 39, no. 4, pp. 949-969.

Delong, D. 1997, 'Building the knowledge-based organization: how culture drives knowledge behaviors', *Working Paper*, Ernst & Young's Center for Business Innovation. Boston.

Demarest, M. 1997, 'Understanding knowledge management', *Long Range Planning,* vol. 30, no. 3, pp. 309-326.

Diamantopoulos, A. & Winklhofer, H. M. 2001, 'Index Construction with Formative Indicators: an Alternative to Scale Development', *Journal of Marketing Research,* Vol. 38, no. 2, pp. 269-277.

Dishaw, M. T. & Strong, D. M. 1999, 'Extending the technology acceptance model with task-technology fit constructs', *Information & Management,* vol. 36, no. 1, pp. 9-21.

Dollinger, M. J. & Golden, P. A. 1992, 'Interorganizational and collective strategies in small firms: environmental effects and performance', *Journal of Management,* vol. 18, pp. 695-715.

Dretske, F. 1981, *Knowledge and the Flow of Information,* MIT Press, Cambridge, MA.

Drew, S. 1999, 'Building knowledge management into strategy: making sense of a new perspective', *Long Range Planning*, vol. 32, no. 1, pp. 130-136.

Drucker, P. 1993, *Post-Capitalist Society*, Harper Business, New York.

Duffy, J. 1999, *Harvesting Experience: Reaping the Benefits of Knowledge*, ARMA International, Prairie village, KS.

Duke, S., Makey, P. & Kiras N. 1999, 'Knowledge Management', Report Series, vol. 1, Butler Group, Hull, UK.

Durrance, B. 1998, 'Some explicit thoughts on tacit dimensions', in *The Knowledge Management Yearbook 1999-2000*, J. W. Cortada & J. A., Woods (eds), Butterworth-Heinemann, Wobum, CA, USA, pp. 28-36.

Dyer, J. 1997, 'Effective interfirm collaboration: how firms minimize transaction costs and maximize transaction value', *Strategic Management Journal*, vol. 18, no. 7, pp. 535-556.

Earl, M. 2001, 'Knowledge management strategies: toward a taxonomy collaboration: how firms minimize transaction costs and maximize transaction value', *Strategic Management Journal*, vol. 18, no. 7, pp. 535-556.

Engel, J. F., Blackwell, R. D. & Miniard, P. W. 1986, *Consumer Behavior,* 5th edn, Holt, Rinehart and Winston, NY.

Fahey, L. & Prusak, L. 1998, 'The eleven deadliest sins of knowledge management', *California Management Review*, vol. 40, no. 3, pp. 265-276.

Farhoomand, A. F., Kira, D. & Williams, J. 1990, 'Managers' Perceptions towards automation in manufacturing', *IEEE Transaction on Engineering Management*, vol. 37, no. 3, pp. 228-232.

Feng, K., Chen, E. T. & Liou, W. 2004, 'Implementation of knowledge management systems and firm performance: an empirical investigation', *Journal of Computer Information System*, vol. 45, no. 2, pp. 92-104.

Ferraro, G. P. 1998, *The Cultural Dimension of International Business,* Prentice Hall, New Jersey.

Fishbein, M. & Ajzen, I. 1975, *Belief, Attitude, Intention and Behavior: An Introduction to Theory and Research*, Addison-Wesley, Reading, MA.

Forman, J. 1999, 'When stories create an organization's future', in *The Knowledge Management Yearbook 2000-2001*, J. W. Cortada & J. A., Woods (eds), Butterworth-Heinemann, Wobum, CA, USA, pp. 231-235.

Fornell, C. & Bookstein, F. L. 1982, 'Two structural equation models' LISREL and PLS applied to consumer exit-voice theory', *Journal of Marketing Research*, November, pp. 440-452.

Fornell, C. & Larcker, D. F. 1981, 'Evaluating Structural Equation Models with Unobservable Variables and Measurement Error', *Journal of Marketing Research,* vol., XVIII, no. February, pp. 39-50.

Gable, G. G. 1994, 'Integrating case study and survey research methods: an example in information systems', *European Journal of Information Systems*, vol. 3, no. 2, pp. 112-126.

Gefen, D, Straub, D. W. & Boudreau, M.-C. 2000, 'Structural equation modeling and regression: guidelines for research practice', *Communications of the Association for Information Systems*, vol. 4, no. 7, pp. 1-62.

Gefen, D. & Keil, M. 1998, 'Developer trust-building behavior and user perceptions of perceived usefulness: a social-exchange perspective', *Data Base of Advances in Information Systems*, vol. 29, no. 2, pp. 35-49.

Gefen, D. & Straub, D. W. 2000, 'The relative importance of perceived ease of use in IS adoption: a study of E-commerce adoption', *Journal of the Association for Information Systems*, vol. 1, no. 8. pp.1-28.

Gefen, D. 2000, 'Lessons learnt from the successful adoption of an ERP: the central role of trust', in *Recent Developments and Applications in Decision Making*, S. Zanakis, G. Doukidis & C. Zopounidis (eds), Kluwer Academic, Norwood, MA.

Glazer, R. 1998, 'Measuring the knower: towards a theory of knowledge equity', *California Management Review*, vol. 40, no. 3, pp. 175-194.

Glock, C. Y. 1987, 'Survey research', in *Social Research Methods: Qualitative and Quantitative Approaches*, W. L. Neuman (eds), Allyn and Bacon, Boston, pp. 227-269.

Gold, A. H., Malhotra, A. & Segars, A. H. 2001, 'Knowledge management: an organizational capabilities perspective', *Journal of Management Information Systems*, vol. 18, no. 1, pp. 185-214.

Goles, T. & Hirschheim, R. 1999, 'The paradigm is dead, the paradigm is dead… long live the paradigm: The legacy of Burrell and Morgan', *Omega,* vol. 28, no. 3, pp. 249-268.

Gordon, J. 1999 'The whole enchilada: intellectual capital and you', in *The Knowledge Management Yearbook 2000-2001,* J. W. Cortada & J. A., Woods (eds), Butterworth-Heinemann, Wobum, CA, USA, pp. 157-168.

Gottschalk, P. 1999, 'Use of IT for knowledge management in law firms', *Journal of*

Information, Law, and Technology, Retrieved May 6, 2007, from: *http://elj*.warwick.ac.uk/jilt/99~3gGottschalk.html.

Govindarajulu, C. & Reithel, B. 1997, 'Beyond the information center' an instrument to measure end user computing from multiple sources', *Information and Management*, vol. 33, no. 5, pp. 241-250.

Grant, R. 1996, 'Toward a knowledge-based theory of the firm', *Strategic Management Journal,* vol. 17, Winter, pp. 109-122.

Greene, J. C., Caracelli. V. J. & Graham, W. F. 1989, 'Toward a conceptual framework for mixed-method evaluation designs', *Educational Evaluation and Policy Analysis*, vol. 11, pp. 255-274.

Grover, V. & Davenport, T. H. 2001, 'General perspectives on knowledge management: fostering a research agenda', *Journal of Management Information Systems*, vol. 18, no. 1, pp. 5-21.

Grover, V. & Goslar, M. D. 1993, 'The initiation, adoption, and implementation of telecommunication technologies in US organizations', *Journal of Management Information Systems*, vol. 10, no. 1, pp. 141-163.

Grover, V. 1993, 'An empirically derived model for the adoption of customer-based interorganizational systems', *Decision Sciences*, vol. 24, no. 3, pp.603-640.

Guba, E. G. & Lincoln, Y. S. 1994, 'Competing paradigm in qualitative research', in *Handbook of Qualitative Research*, N. K. Denzin & Y. S. Lincoln (eds), Sage Publ. Inc., Thousand Oaks, California, pp. 105-117.

Halal, W. E. 1997, 'Organizational Intelligence: what is it, and how can managers use it?', in *The Knowledge Management Yearbook 1999-2000*, J. W. Cortada & J. A., Woods (eds), Butterworth-Heinemann, Wobum, CA, USA, pp. 65-69.

Hanlon, D. 2001, 'Vision and support in new venture start-ups' *Frontiers for Entrepreneurship Research Conference*, Jonkoping, Sweden.

Hasan, H. & Al-Hawari M. 2003, 'Management styles and performance: a knowledge space framework', *Journal of knowledge Management*, vol. 7, no. 4, pp. 15-28.

Hauser, J. R. & Shugan, S. M. 1980, 'Intensity measures of consumer preference', *Oper. Res.,* vol. 28, pp. 279-320.

Hayes-Roth, F., Waterman, D. A & Lenat, D. B. 1983, 'An overview of expert systems', in *Building Expert Systems*, E. Hayes-Roth, D. A. Waterman & E. B Lenat (eds), Addison-Wesley , Reading, MA, pp. 3-29.

Hessler, R. M. 1992, *Social Research Methods*, West Publishing Company, USA.

Hislop, D., Newell, S., Scarborough, H. and Swan, J. (2000), 'Innovation processes and the management of knowledge', in *Knowledge Management: Concepts and Controversies Conferences*, University of Warwick, Coventry, UK.

Holmes-Smith, P. 2000, *Introducing to Structural Equation Modeling Using LISREL,* School research, Evaluation and Measurement Services, Elsternwick.

Holsapple, C. W. & Joshi, K. D. 2000, 'An investigation of factors that influence the management of knowledge in organization', *Journal of Strategic Information Systems,* vol. 9, no. 2-3, pp. 235-261.

Holsapple, C. W. & Singh, M. 2001, 'The knowledge chain model: activities for competitiveness', *Expert Systems with Applications,* vol. 20, no. 1, pp. 77-98.

Holtham, C., and Courtney, N. 1998, 'The executive learning ladder: a knowledge creation process grounded in the strategic information systems domain', in *Proceedings of the Fourth Americas Conference on Information Systems*, E. Hoadley & I. Benbasat (eds.), Baltimore, MD, pp. 594-597.

Holtshouse, D. 1998, 'Knowledge Research Issues', *California Management Review*, no. 40, no. 3, pp.277-280.

Holzner, B. & Marx, J. 1979, *The Knowledge Application: the Knowledge System in Society,* Allyn and Bacon, Boston.

Horvath, J. A. 2000, 'Working with tacit knowledge', in *The Knowledge Management Yearbook 2000-2001*, J. W. Cortada & J. A., Woods (eds), Butterworth-Heinemann, Wobum, CA, USA, pp. 65-69.

Hsiao, Chen-Nung 2003, *To Probe Deeply into the Customer Relationship Management Strategy and Operation Flow of Life Insurance - ex. Nan Shan Life Insurance Co, LTD.* (in Chinese), Masters thesis, Sun Yat-Sen University, Taiwan.

Huang, Wei-Bing 2002, *Knowledge Management, Innovative Strategic, Organization Performance-Taiwan Integrated Electronic Circuit Products*, Masters thesis, Da-Yeh University, Taiwan.

Huff, S. L. & Munro, M. C. 1985, 'Information technology assessment and adoption: a field study', *MIS Quarterly*, vol. 9, no. 4, pp. 327-339.

Hulland, J. 1999, 'Use of Partial Least Square (PLS) in strategic management research: a review of four recent studies', *Strategic Management Journal,* vol. 20, no. 2, pp. 195-204.

Hung, Hsiang-Chin 2004, *An ISO 9000-based Knowledge Management System for Small and Medium-Sized Enterprises*, PhD thesis, National Cheng Kung University, Taiwan.

Hung, Hui-Shu 2003, *Knowledge Management Strategy and Relationship Marketing Stud y- the Case of the Insurance Industry*, Masters thesis, Shih Chen University, Taiwan.

Hung, Mao-Sheng 2003, *The Influences of Learning Style, Learning Structures, Knowledge Management, Organizational Culture on Organization Efficiency: an Empirical Study on Small & Medium Size Business in Taiwan*, Masters thesis, National Cheng Kung University, Taiwan.

Hung, Y. C., Huang, S. M., Lin, Q. P. & Tsai, M. L. 2005, 'Critical factors in adopting a knowledge management system for the pharmaceutical industry', *Industrial Management & Data Systems*, vol. 105, no. 2, pp. 164-183.

Hussey, J. & Hyssey, R. 1997, *Business Research: a Practical Guide for Undergraduate and Postgraduate Students*, 1st edn, MacMillian Press Ltd., London.

Igbaria M. 1994, 'An examination of the factors contributing to microcomputer technology acceptance', *Accounting, Management & Information Technology*, vol. 4, no. 4, pp. 205-224.

Igbaria M., Guimaraes, T. & Davis, G. B. 1995, 'Testing the determinants of microcomputer usage via a structural equation model', *Journal of Management Information Systems*, vol. 11, no. 4, pp. 87-114.

Igbaria M., Zinatelli, N., Cargg, P. & Cavaye, A. L. M. 1997, 'Personal computing acceptance factors in small firms: a structural equation model' *MIS Quarterly*, vol. 21, no. 3, pp. 279-302.

Inkpen, A. & Beamish, P. 1997, 'Knowledge, bargaining power, and the instability of international joint ventures', *Academy of Management Review*, vol. 22, no. 1, pp. 177-202.

Inkpen, A. & Dikur, I. 1998, 'Knowledge management processes and international joint ventures', *Organization Science*, vol. 9, no. 4, pp. 454-468.

Inkpen, A. 1996, 'Creating knowledge through collaboration', *California*

Management Review, vol. 31, no. 9, pp. 123-141.

Insurance Bureau 2005, *Annual Report 2003,* Financial Supervisory Commission, Executive Yuan, Taiwan, Retrieved March 12, 2007, from: http://www.ib.gov.tw/lp.asp?ctNode=2337&CtUnit=641&BaseDSD=7&mp=4.

Insurance Law, Insurance Bureau, Financial Supervisory Commission, Retrieved: May 15, 2005, from http://www.ib.gov.tw/mp.asp.

Ivari, J & Linger, H. 1999, 'Knowledge work as collaborative work: a situated activity theory view', in *Proceedings of the Thirty-Second Annual Hawaii International Conference on Systems Sciences,* IEEE Computer Society Press, Los Alamito, CA.

Ives, W., Torrey, B. & Gordon, C. 1998, 'Knowledge management: an emerging discipline with a long history', *Journal of Knowledge Management*, vol. 1, no. 4, pp. 269-273.

Jackson, C. M., Chow, S. & Leitch, R. A. 1997, 'Toward an understanding of the behavioral intention to use an information system', *Decision Sciences*, vol. 28, no. 2, pp. 357-389.

Johnson, A. R. 2000, 'Competitive intelligence and competitor analysis as knowledge management applications', in *The Knowledge Management Yearbook 2000-2001*, J. W. Cortada & J. A., Woods (eds), Butterworth-Heinemann, Wobum, CA, USA, pp. 85-97.

Kalling, T. 2003, 'Knowledge management and the occasional links with performance', *Journal of Knowledge Management,* vol. 7, no. 3, pp. 67-81.

Karahanna, E. , Straub, D. W. & Chervany, N. L. 1999, 'Information technology adoption across time: a cross-sectional comparison of pre-adoption and post-adoption beliefs', *MIS Quarterly,* vol. 23, no. 2, pp. 183-213.

Kaye, S. 1999, 'Some proven ways to promote the exchange of ideas', in *The*

Knowledge Management Yearbook 2000-2001, J. W. Cortada & J. A., Woods (eds), Butterworth-Heinemann, Wobum, CA, USA, pp. 391-398.

Keil, M., Beranek, P. M. & Konsynski, B. R. 1995, 'Usefulness and ease of use: field study evidence regarding task considerations', *Decisions Support Systems,* vol. 13, no. 1, pp. 75-91.

Kendall, J. D., Tung, L. L., Chua, K. H., Ng, C. H. D. & Tan, S. M. 2001, 'Receptivity of Singapore's SMEs to electronic commerce adoption', *Journal of Strategic Information Systems*, vol. 10, no. 3, pp. 223-242.

Kim, N. & Srivastava, R. K. 1998, 'Managing intraorganizational diffusion technological innovations', *Industrial Marketing Management,* vol. 27, no. 3, pp. 229-246.

Kimberly, J. R. & Evansiko, M. J. 1981, 'Organizational Innovation: the influence of individual, organizational, and contextual factors on hospital adoption of technological and administrative innovation', *Academy of Management Journal,* vol. 24, no. 4, pp. 689-713.

Kogut, B. & Zander, U. 1992, 'Knowledge of the firm, combinative capabilities and the replication of technology', *Organization Science*, vol. 3, no. 3, pp. 383-397.

Kotabe, M., Martin, X. & Domoto, H. 2003, "Gaining from vertical partnerships' knowledge transfer, relationship duration, and supplier performance improvement in the U.S. and Japanese automotive industries", *Strategic Management Journal*, vol. 24, no. 4, pp. 293-316.

Kuhn, T. S. 1970, *The Structure of Scientific Revolution,* University of Chicago Press, Chicago.

Kwon, T. H. & Zmud, R. W. 1987, 'Unifying the fragment models of information systems implementation', in *Critical Issues in Information System Research*, R. J.

Boland Jr. & R. A. Hirscheim (eds), John Wiley & Sons, New York, pp. 227-251.

Larker, D. F. & Lessig, V. P. 1980, 'Perceived usefulness of information: a psychometric examination', *Decision Sci*., vol. 11, pp. 121-134.

Larsen, T. J. & Wetherbe, J. C. 1999 'An exploratory field study of differences in information technology use between more and less innovative middle manager', *Information & Management,* vol. 36, no. 2, pp. 93-108.

Lee, M .K. O. 1998, 'Internet-based financial EDI: towards a theory of its organizational adoption', *Computer Network and ISDN Systems,* vol. 30, no. 16-18, pp. 1579-1588.

Leonard, D & Sensiper, S 1998, 'The role of tacit knowledge in group innovation', *California Management Review,* vol. 40, no. 3, pp. 112-132.

Leonard, D. 1995, *Wellsprings of Knowledge: Building and Sustaining the Source of Innovation'*, Harvard Business School Press, Boston.

Lepper, M. R. 1985, 'Microcomputers in education: motivational and social issues', *Amer. Psychologist*, vol. 40, pp. 1-18.

Li, H. & Atuahene-Gima, K. 2001, 'Product innovation strategy and the performance of new technology ventures in China', *Academy of Management Journal,* vol. 44, no. 6, pp. 1123-1134.

Liebowitz, J. 1999b, 'Knowledge management: Factors or fiction', in *Knowledge Management Handbook*, J. Liebowitz (eds), CRC Press LLC, Boca Raton, USA, pp. iii-v.

Liebowitz. J. 1999a, 'Key ingredients to the success of an organization's knowledge management strategy', *Knowledge and Process Management,* vol. 6, no. 1, pp. 37-40.

Liker, J. K. & Sindi, A. A. 1997, 'User acceptance of expert systems: a test of the theory of reasoned action', *Journal of Engineering and Technology Management,* vol. 14, no. 2, pp. 147-173.

Lin, Chen-Guey 2001, *Study of the Relationships among Knowledge Management, Engineering Professionals' Core Competences and Job Performance - Taking the China Steel Corporation as Example* (in Chinese), Masters thesis, National Sun Yat-Sen University, Taiwan.

Lin, J. C.-C. & Lu, H. 2000, 'Towards an understanding of the behavioral intention to use a web site', *International Journal of information Management,* vol. 20, no. 3, pp. 197-208.

Liou, Jih-Wei 2004, *The Influences of the Structural and Relational Factors in Interfirm Knowledge Sharing on Organizational Performances* (in Chinese), Masters thesis, I-Shou University, Taiwan.

Liu, Wey-Ting 2004, *A Study of Diffusion of Information Technology in the Organization-to Discuss on TAM and TTF*, Masters thesis, Soochow University, Taiwan.

Lo, Kuo-Hui 2003, *A Study of the Satisfaction and Performance of Using Customer Relationship Management System (CRM) - a Case of Life Insurance Agent* (in Chinese), Masters thesis, Feng Chia University, Taiwan.

Lu, Pei-Hua 2002, *A Study of Applying Knowledge Management to Enhance Customer Relationship Management - Insurance Industry as an Example* (in Chinese), Masters thesis, National Changhua University of Education, Taiwan.

Lucas, H. C. & Spitler, V. K. 1999, 'Technology use and performance: a field study of broker workstations', *Decision Sciences*, vol. 30, no. 2, pp. 291-311.

Lundvall, B. A. 1996, 'The social dimension of the learning economy', *DRUID*

Working Papers, Aalborg University, Denmark.

Machlup, F. 1980, *Knowledge: Its Creation, Distribution, and Economic Significance,* vol. I, Princeton University Press, Princeton, NJ.

Malhotra, Y. 2000, *Knowledge Management and Virtual Organizations*, Idea Group Publishing, Hershey, USA.

Malone, T. W. 1981a, 'Toward a theory of intrinsically motivation instruction', *Cognitive Science*, vol. 4, pp. 333-369.

Malone, T. W. 1981b, 'What makes computer games fun?', *Byte*, December, pp. 258-276.

Manross, G. G & Rice, R. E. 1986, 'Don't hank up: organizational diffusion of the intelligent telephone', *Information & Management*, vol. 10, no. 3, pp. 161-175.

Massey, A. P., Montoya-Weiss, M. M. & O'Driscoll T. M. 2002, 'Knowledge management in pursuit of performance: insights from Nortel Networks', *MIS Quarterly*, Vol. 26, no. 3, pp.269-289.

Mata, F. J., Fuerst, W. L. & Barney, J. B. 1995, 'Information technology and sustained competitive advantage: a resource-based analysis', *MIS Quarterly,* vol. 19, no. 4, pp. 487-505.

Mathieson, K. 1991, 'Predicting user intentions: comparing the technology acceptance model with the theory of planned behavior', *Information Systems Research,* vol. 2, no. 3, pp. 173-191.

McDermott, R. 1999, 'Why information technology inspired but cannot deliver knowledge management', *California Management Review,* vol. 4, no. 4, pp. 103-117.

McGowan, M. K. & Madey, G. R. 1998, 'Adoption and implementation of electronic

data interchange', *in Information Systems Innovation and Diffusion: Issues and Directions,* T. J. Larsen & E. McGUIRE (eds), Idea Group Publishing, London, UK, pp. 116-140.

McIntosh, A.R., Bookstein, F. L., Haxby, J. V. & Grady, C. L. 1996, 'Spatial pattern analysis of functional brain images using partial least squares', *Neuroimage*, vol. 3, no. 16, pp. 43-457.

McQueen, R. 1998, 'Four views of knowledge and knowledge management', in *Proceedings of the Fourth Americas Conference on Information Systems,* E. Hoadley & I. Benbasat (eds), pp. 609-611.

Merriam, S. B. 2001, *Qualitative Research and Case Study Applications in Education*, Jossey-Bass, San Francisco.

Michalisin, M. D., Smith, R. D. & Kline, D. M. 1997, 'In search of strategic assets', *International Journal of Organizational Analysis,* vol. 5, no. 4, pp. 360-387.

Microsoft, Taiwan 2005, 'The quiet revolution of Cathay Life Insurance Co.', Retrieved May 13, 2005, from: http://www.microsoft.com/taiwan/business/km/cathay.htm.

Miles, M. B. & Huberman, M. A. 1994, *An Expanded Sourcebook: Qualitative Data Analysis*, 2nd edn, Sage Publications, Thousands Oaks, California.

Miller, W. 1999, 'Building the ultimate resource', in *The Knowledge Management Yearbook 2000-2001*, J. W. Cortada & J. A., Woods (eds), Butterworth-Heinemann, Wobum, CA, USA, pp. 300-306.

Mingles, J. 2001, 'Combining IS research methods: towards a pluralist methodology', I*nformation System Research*, vol. 12, no. 3, p.240.

Mitra, S & Chaya, A. K. 1996, 'Analyzing cost-effectiveness of organizations: the

impact of information technology spending', *Journal of Management Information Systems,* vol. 13, no. 2, pp. 29-57.

Moore, G. C. & Benbasat, I. 1991, 'Development of an instrument to measure the perceptions of adopting an information technology innovation', *Information System Research,* vol. 2, no. 3, pp. 192-222.

Moore, G. C. 1987, 'Und-user computing and office automation: a diffusion of innovation perspectives', *INFOR,* vo25, no. 3, pp. 214-235.

Moore, J. 1996, *The Death of Competition: Leadership and Strategy in the Age of Business Ecosystems*, HarperCollins, New York.

Nahapiet, J. & Ghoshal, S. 1998, 'Social capital, intellectual capital, and the organizational advantage', *Academy of Management Review,* vol. 23, no. 2, pp. 242-266.

Neuman, W. L. 2000, *Research Methods: Qualitative and Quantitative Approaches*, 4th edn, Allyn and Bacon, Boston.

Nickols, F. 2000, 'The knowledge in knowledge management', in The Knowledge Management Yearbook 2000-2001, J. W. Cortada & J. A., Woods (eds), Butterworth-Heinemann, Wobum, CA, USA, pp. 12-21.

Nidumolu, S. R., Subramani, M. & Aldrich A. 2001, 'Situated Learning and the situated knowledge web: exploring the ground beneath knowledge management', *Journal of management Information Systems,* vol. 18, no. 1, pp. 115-150.

Nieswiadomy, R. M. 2002, *Foundations of Nursing Research*, 4th edn, Prentice Hall, Upper Saddle River, NJ.

Nonaka, I & Takeuchi, H 1995, *The Knowledge-Creating Company: How Japanese Companies Create the Dynamics of Innovation*, Oxford University Press, New York.

Nonaka, I. & Konno, N. 1998, 'The concept of "ba": building a foundation for knowledge creation', *California Management Review,* vol. 40, no. 3, pp. 40-54.

Nonaka, I. 1994, 'A dynamic theory of organizational knowledge creation', *Organization Science,* vol. 5, no. 1, pp. 14-37.

Norton, J. A. & Bass, F. M. 1987, 'A diffusion theory model of adoption and substitution for successive generations of high-technology products', *Management Science*, vol. 33, no. 9, pp. 1069-1086.

Nunnally, J. C. & Bernstein, I. H. 1994, *Psychometric Theory,* 3rd edn, McGRAW-HILL, INC. New York.

Nurmi, R. 1998, 'Knowledge-intensive firms', in *The Knowledge Management Yearbook 1999-2000*, J. W. Cortada & J. A., Woods (eds), Butterworth-Heinemann, Wobum, CA, USA, pp. 168-179.

O'Dell, C. & Grayson, C. 1998, 'If only we knew what we know: identification and transfer of internal best practices', *California Management Review,* vol. 40, no. 3, pp. 154-174.

Parasuraman, A., Zeithaml, V. A. & Berry, L .L., 1985, 'A conceptual model of service quality and its implication for future research', *Journal of Marketing*, vol. 49, no. 4, pp. 41-50.

Parasuraman, A., Zeithaml, V. A. & Berry, L. L., 1988, 'SERVQUAL: a multiple item scale for measuring customer perceptions of service quality', *Journal of Retailing*, vol. 64, no. 1, pp. 12-40.

Pearson, T. A. 1999, 'Measurements and the knowledge revolution', in *The Knowledge Management Yearbook 2000-2001*, J. W. Cortada & J. A., Woods (eds), Butterworth-Heinemann, Wobum, CA, USA, pp. 408-417.

Pentland, B. T. 1995, 'Information systems and organizational learning: the social epistemology of organizational knowledge systems', *Accounting Management and Information Technology,* vol. 5, no. 1, pp. 1-21.

Phillips Fox, 1998, 'Leading the way in knowledge management', Retrieved July 20, 2001, from: www.phillipsfox.com.au/phillipsfox/publications/pbo98006.htm.

Plesk, P. E. 1998, 'Incorporating the tools of creativity into quality management', in *The Knowledge Management Yearbook 1999-2000*, J. W. Cortada & J. A., Woods (eds), Butterworth-Heinemann, Wobum, CA, USA, pp. 70-85.

Polanyi, M. 1966, *The Tacit Dimension*. London: Routledge and Kegan Paul.

Porter-Liebskind, J. 1996, 'Knowledge, strategy, and the theory of the firm', *Strategic Management Journal,* vol. 17, Winter, pp. 93-107.

Poston, R. & Grabski, S. 2001, 'Financial impacts of enterprise resources planning implementation', *International Journal of Accounting Information Systems,* vol. 2, pp. 271-294.

Powell, T. C. 1992, 'Organizational alignment as competitive advantage', *Strategic Management Journal,* vol. 13, pp. 119-134.

Premkumar, G. & Potter, M. 1995, 'Adoption of computer aided software engineering (CASE) technology: an innovation adoption perspective', *Data Base for Advances in Information Systems*, vol. 26, no. 3, pp. 105-123.

Quaddus, M. 2004, 'A Partial Least Square approach to modelling electronic commerce success in Australia', in *International Conference on Computing and Information Technology*, December 25-27, DHAKA.

Quaddus, M. A. 1995, 'Diffusion of information technology: an exploration of the

stage models and facilitating the users' choice by system approach', in *The 1995 Pan Pacific Conference on Information Systems,* C. H. Chuan & J. S. Khaliwal (eds), Singapore, pp. 191-199.

Quintas, P., Lefrere, P. & Jones, G. 1997, 'Knowledge management: a strategic agenda', *Long Range Planning*, vol., 30, no. 3, pp. 385-391.

Rai, A., Ravichandran, T. & Samaddar, S. 1998, 'How to anticipate the internet's global diffusion', *Communication of the ACM*, vol. 41, no. 10, pp. 97-106.

Robertson, J. 2002, 'Using usability to direct KM systems', Retrieved May 6, 2007, from: http://www.steptwo.com.au/papers/kmc_usability/index.html.

Roberts-Witt, S. L. 1999, 'Practical tazonomies', in *The Knowledge Management Yearbook 1999-2000*, J. W. Cortada & J. A., Woods (eds), Butterworth-Heinemann, Wobum, CA, USA, pp. 214-222.

Rogers, E. M. 1995, *Diffusion of Innovations,* 4th edn, Free Press, New York, USA.

Roth, G. & Kleiner, A. 1998, 'Developing organizational memory through learning histories', in *The Knowledge Management Yearbook 2000-2001*, J. W. Cortada & J. A., Woods (eds), Butterworth-Heinemann, Wobum, CA, USA, pp. 123-144.

Ruber, P. 1998, 'Getting smart with business intelligence', in *The Knowledge Management Yearbook 1999-2000*, J. W. Cortada & J. A., Woods (eds), Butterworth-Heinemann, Wobum, CA, USA, pp. 80-89.

Ruggles, R. 1998, 'The state of the notion: knowledge management in practice', *California Management Review*, vol. 40, no. 3, pp. 80-89.

Santosa, P. I., Wei, K. K. & Chan, H. C. 2005, 'User involvement and user satisfaction with information-seeking activity', *European Journal of Information Systems*, vol. 14, pp. 361-370.

Sarvary, M. 1999, 'Knowledge management and competition in the consulting industry', *California Management Review,* vol. 41, no. 2, pp. 95-107.

Scarbrough, H., Swan, J. & Preston, J. 1999, *Knowledge Management: A Literature Review*, Institute of Personnel & Development, London.

Schubert, P., Linche, D. & Schmid, B. 1998, 'A global knowledge medium as a virtual community: the NetAcademy concept', in *Proceedings of the Fourth Americas Conference on Information Systems,* E. Hoadley & I. Benbast (eds), Baltimore, MD, August, pp. 618-620.

Shaw, G., Brown, R. & Bromiley, P. 1998, 'Strategic stories: how 3M is rewiring business plan', in *The Knowledge Management Yearbook 1999-2000*, J. W. Cortada & J. A., Woods (eds), Butterworth-Heinemann, Wobum, CA, USA, pp. 233-244.

Shin, M., Holden, T. & Schmidt. R. A. 2001, 'From knowledge theory to management practice: towards an integrated approach', *Information Processing and Management,* vol. 37, no. pp. 335-355.

Silberston, A. 1967, 'The patent system', *Lloyds Bank Review* 84, April, pp. 32-44.

Skyrme, C. & Amidon, D. 1998, 'The knowledge agenda', in *The Knowledge Management Yearbook 1999-2000*, J. W. Cortada & J. A., Woods (eds), Butterworth-Heinemann, Wobum, CA, USA, pp. 108-125.

Skyrme, D. & Amidon, D. 1997, *Creating the Knowledge Based Business*, Business Intelligence Ltd, London.

Spender, J. C. 1996, 'Making knowledge the basis a dynamic theory of the firm', *Strategic Management Journal,* vol. 17, Winter, pp. 45-62.

Stephenson, M. & Davies, T. 1999, 'Technology support for sustainable innovation',

in *The Knowledge Management Yearbook 2000-2001*, J. W. Cortada & J. A., Woods (eds), Butterworth-Heinemann, Wobum, CA, USA, pp. 329-335.

Straub, D. W. 1989, 'Validating Instruments in MIS Research', *MIS Quarterly,* vol. 13, no. 2, pp. 147-169.

Straub, D. W. 1994, 'The effect of culture on IT diffusion: e-mail and FAX in Japan and the U.S.', *Information Systems Research*, vol. 5, no. 1, pp. 23-47.

Straub, D. W., Limayem, M & Karahanna, E. 1995, 'Measuring system usage: implications for IS theory testing', *Management Science*, vol. 41, no. 8, pp. 1328-1342.

Straub, D. W., Keil, M. Brenner, W. 1997, 'Testing the technology acceptance model across cultures: a three country study', *Information & Management*, vol. 33, no. 1, pp. 1-11.

Strauss, A. L. & Corbin, J. 1990, *Basics of Qualitative Research: Grounded Theory Procedures and Techniques*, Sage, London

Su, Cheng-Hung 2002, *Construction and Measurement for Knowledge Management Performance: a Cross-Empirical Survey*, Masters thesis, I-Shou University, Taiwan.

Subramanian, G. H. 1994, 'A replication of perceived usefulness and perceived ease of use measurement', *Decision Sciences,* vol. 25, no. 5 &6, pp. 863-874.

Sultan, R. & Chan, L. 2000, 'The adoption of new technology: the case of object-oriented computing in software companies', *IEEE Transactions on Engineering Management*, vol. 47, no. 1, pp. 106-125.

Sveiby, K. E. 1997, *The New Organizational Wealth: Managing and Measuring Knowledge-Based Assets*, Berrett-Koehler Publishers, San Francisco, USA.

Sveiby, K. E. 1998, 'Tacit knowledge', in *The Knowledge Management Yearbook 1999-2000*, J. W. Cortada & J. A., Woods (eds), Butterworth-Heinemann, Wobum, CA, USA, pp. 18-27.

Swanson, E. B. 1982, 'Measuring user attitudes in MIS research: a review', *Omega*, vol. 10, no. 2, pp. 157-165.

Swanson, E. B. 1987, 'Information channel disposition and use', *Decision Sc*i., vol. 18, pp. 131-145.

Szajna, B. 1996, 'Empirical evaluation of the revised technology acceptance model', *Management Science*, vol. 42, no. 1, pp. 85-92.

Taiwan Insurance Institute 2006, 'The Important indexes of insurance industry, Taiwan', Retrieved February 12, 2007, from: http://www.iiroc.org.tw/index.asp.

Tan, M. & Teo, T. S. H. 2000, 'Factors influencing the adoption of internet banking', *Journal of the Association for Information Systems*, vol. 1, no. 5, pp. 21-44.

Tanler, R. 1999, 'Maximizing intellectual assets', in The Knowledge Management Yearbook 2000-2001, J. W. Cortada & J. A., Woods (eds), Butterworth-Heinemann, Wobum, CA, USA, pp. 387-390.

Tashakkori, A. & Teddlie, C. 2003, *Handbook of Mixed Methods in Social and Behavioral Research*, Sage Publ. Inc., Thousand Oaks, California.

Taylor, S. & Todd, P. A. 1995a, 'Assessing IT usage; the role of prior experience', *MIS Quarterly,* vol. 19, no. 4, pp. 561-570.

Taylor, S. & Todd, P. A. 1995b, 'Understanding information technology usage: a test of competing models', *Information System Research,* vol. 6, no. 2, pp. 144-176.

Teece, C. 1998, 'Capturing value from knowledge assets: the new economy, markets

for know-how and intangible assets', *California Management Review,* vol. 40, no. 3, pp. 55-79.

Teece, D. J. 1980, 'The diffusion of an administrative innovation', *Management Science,* vol. 26, no. 5, pp. 464-470.

Teresko, J. 1999, 'Information rich, knowledge poor', in The Knowledge Management Yearbook 2000-2001, J. W. Cortada & J. A., Woods (eds), Butterworth-Heinemann, Wobum, CA, USA, pp. 321-325.

The Conference Board 1999, *Beyond Knowledge Management: New Ways to Work and Learn*, The Conference Board Inc, New York, USA.

Thomas, D. & Keithley, T. 2002, 'Knowledge management improves performance', *AACE International Transactions*, June 23-26, pp. PM.17.1-PM.17.4.

Thompson, R. L., Higgins, C. A. & Howell, J. M. 1991, 'Personal computing: toward a conceptual model of utilization', *MIS Quarterly,* vol. 15, no. 1, pp. 125-143.

Thompson, R. L., Higgins, C. A. & Howell, J. M. 1994, 'Influence of experience on personal computer utilization: test a conceptual model', *Journal of Management Information Systems,* vol. 11, no. 11, pp. 167-187.

Thong, J. Y. L. & Yap, C. S., 1995, 'CEO characteristics, organizational characteristics and information technology adoption in small business', *Omega*, vol. 23, no. 4, pp. 429-442.

Thong, J. Y. L. 1999, 'An integrated model of information systems adoption in small business', *Journal of Management Information Systems,* vol. 15, no. 4, pp. 187-214.

Timko, C. 1987, 'Seeking medical care for a breast cancer symptom: determinants of intentions to engage in prompt or delay behavior', *Health Psychology*, vol. 6, no. 4, pp. 305-328.

Tiwana, A. 2001, *The Knowledge Management Toolkit: Practical Techniques for Building Knowledge Management System*, Prentice Hall, Englewood Cliffs, NJ.

Tobin, D. R. 1998, 'Networking your knowledge', in *The Knowledge Management Yearbook 1999-2000*, J. W. Cortada & J. A., Woods (eds), Butterworth-Heinemann, Wobum, CA, USA, pp. 389-393.

Trussler, S. 1998, 'The rules of the game', in *The Knowledge Management Yearbook 1999-2000*, eds J. W. Cortada & J. A., Woods (eds), Butterworth-Heinemann, Wobum, CA, USA, pp. 280-286.

Tsoukas, H. 1995, 'The firm as a distributed knowledge system: a constructionist approach', *Strategic Management Journal,* vol. 17, Winter, pp.11-25.

Tuomi, I. 1999, 'Data is more than knowledge: implications of the reversed hierarchy for knowledge management and organizational memory', in *Proceedings of the Thirty-Second Hawaii International Conference on Systems Sciences,* IEEE Computer Society Press, Los Alamitos, CA.

Ulrich, D. 1998, 'Intellectual capital = competence x commitment', in *The Knowledge Management Yearbook 1999-2000*, J. W. Cortada & J. A., Woods (eds), Butterworth-Heinemann, Wobum, CA, USA, pp. 126-144.

Usunier, J. C. 1998, *International and Cross Cultural Management Research*, Sage Publication, London.

Vance, D. M. 1997, 'Information, knowledge and wisdom: the epistemic hierarchy and computer-based information system', in *Proceedings of the Third Americas Conference in Information Systems,* B. Perkins & I. Vessey (eds), August, Indianapolis, IN.

Venkatesh, V & Davis, F. D. 1994, 'Modeling the determinants of perceived ease of

use', in *Proceedings of the Fifteenth International Conference on Information Systems*, J. I. DeGross, S. L. Huff & M. C. Munro (eds), Vancouver, British Columbia, pp. 213-227.

Venkatesh, V & Davis, F. D. 2000, 'A theoretical extension of the technology acceptance model: four longitudinal field studies', *Management Science*, vol. 46, no. 2, pp. 186-204.

Venkatesh, V & Morris, M. G. 2000, 'Why don't men ever stop to ask for directions? gender, social influence, and their role in technology acceptance and usage behavior', *MIS Quarterly,* vol. 24, no. 1, pp. 115-139.

Venkatesh, V. 1999, 'Creation of favorable user perceptions: exploring the role of intrinsic motivation', *MIS Quarterly*, vol. 23, pp. 239-260.

Venkatesh, V., Morris, M. G. & Ackerman, P. L. 2000, 'A longitudinal field investigation of gender differences in individual technology adoption decision-making process', *Organizational Behavior and Human Decision Processes,* vol. 83, no. 1, pp. 33-60.

Venkatesh, V., Morris, M. G., Davis, G. B. & Davis, F. D. 2003, 'User acceptance of information: toward a unified view', *MIS Quarterly,* vol. 27, no. 3, pp. 425-478.

von Krogh, G., Roos, J. & Slocum, K. 1994, 'An essay on corporate epistemology', *Strategic Management Journal*, vol. 15, Summer, pp. 53-71.

Wang, Chia-Hung 2002, *The Study of the Relationship between Knowledge Diffusion Channels and Performance - an Empirical Study of Sailing Industry* (in Chinese), Masters thesis, National Taiwan Ocean University, Taiwan.

Wang, Chi-Lun 2004, *An Empirical Study o the Relationship Between Knowledge Management Styles and Business Performance for Commercial Banks in Taiwan* (in Chinese), Masters thesis, National Cheng Kung University, Taiwan.

Wang, F. W. & Plaskoff, J. 2002, 'An integrated development model', in *Knowledge Management Strategy and Technology,* R. F. Bellaver & J.M. Lusa (eds), Artech House, Boston, USA, pp. 113-134.

Wang, T. U. 2005, Promoting knowledge management to enhance business competitiveness - discussing the case of knowledge management in Metropolitan Insurance & Annuity Co. Taiwan Branch, Retrieved June 2, 2005, from: http://proj.moeaidb.gov.tw/nqpp/q2002/Q2001/com07/com07_2.htm.

Wang, *Tsai-Pai 2002, Analysis of Knowledge Management Culture and Corporate Efficiencies in High Tech Industry*, Masters thesis, National Sun Yat-Sen University, Taiwan.

Wareham, E. 1999, 'Knowledge management spending to skyrocket: IDC', *Computing Canada*, vol. 25, no. 41, P.6.

Watson, R. T. 1999, *Data Management: Databases and Organizations*, 2nd edn, John Wiley, New York.

Weick, K. E. & Roberts, K. 1993, 'Collective mind in organizations: heedful interrelating on flight decks', *Administrative Science Quarterly,* vol. 6, no. 3, pp. 357-381.

Wernerfelt, B 1984, 'A resource-based view of the firm', *Strategic Management Journal,* vol. 5, no. 2, pp. 171-180.

Wiig, K. 1993, *Knowledge Management Foundations: Thinking about Thinking - How People and Organizations Create, Represent, and Use Knowledge*, Schema Press, Arlington, Tex., USA.

Wiig, K. M. 1997, 'Knowledge Management: an introduction and a perspective', *Journal of Knowledge Management*, vol. 1, no. 1, pp. 6-14.

Wiig, K. M. 1999, 'Introducing knowledge management into the enterprise', in *Knowledge Management Handbook,* J. Liebowitz (eds), CRC Press LLC, Boca Raton, USA, pp. 3-1~3-45.

Wiig, K. M., de Hodg, R. & van der Spek, R. 1997, 'Supporting knowledge management: a selection of methods and techniques', *Expert Systems with Applications*, vol. 13, no. 1, pp. 15-27.

Wilson, L. T. 2000, 'Putting quality in managing corporate memory', in *The Knowledge Management Yearbook 2000-2001*, J. W. Cortada & J. A., Woods (eds), Butterworth-Heinemann, Wobum, CA, USA, pp. 374-386.

Wolcott, P., Press, L., McHenry, W., Goodman S. & Foster, W. 2001, 'A framework for assessing the global diffusion of the internet', *Journal of the Association for Information Systems*, vol. 2, no. 6, pp. 1-52.

Wong, K. Y. & Aspinwall E. 2005, 'An empirical study of the important factors for knowledge-management adoption in the SME sector', *Journal of Knowledge Management*, vol. 9, no. 3, pp. 64-82.

Wright, L. L. 1996, 'International management survey research', in *Handbook for International Managerial Research*, B. J. Punnet & O. Shenkar (eds), Blackwell Publishers, Cambridge.

Wu, Chia-Chun 2004, *The Study of Relationships among Different Strategy Type, Knowledge Management System Features, and Performance: with the Example of Hi-Tech Industry*, Masters thesis, Leader University, Taiwan.

Wu, Chi-Min 2003, *A Study of the Correlations among Knowledge Management Strategy, Organizational Core Competence and Business Performance - an Empirical Research of Biotechnology*, Masters thesis, Chang Jung Christian University, Taiwan.

Wu, Hsin-Ning 2003, *Research on Influence over the Relationship between Knowledge Management and Administration Effectiveness - Take the Accounting Affairs of County and City Governments for Example*, Masters thesis, Nanhua University, Taiwan.

Wu, Hui-Hsuan 2004, *Mechanism and Cultural Perspectives of Knowledge Management: Model Construction and an Empirical Survey Linking with Knowledge Strategy and Performance*, Masters thesis, I-Shou University, Taiwan.

Wynekoop, J. L., Senn, J. A. & Conger, S. A. 1992, 'The implementation of case tools: an innovation diffusion approach', in *The Impact of Computer Supported Technologies on Information Systems Development,* Eldevier Science Publishers B. V. (North-Holland), pp. 25-41.

Xu, J. & Quaddus, M. 2005, 'A six-stage model for the effective diffusion of knowledge management systems', *Journal of Management Development*, vol. 24, no. 4, pp. 362-373.

Xu, J. 2003, *A Study of the Factors Influencing Knowledge Management Systems Diffusion in Australia*, PhD thesis, Curtin University of Technology, Australia.

Yang, Cheng-Hsueh 2004, 'The practical operation of knowledge management on life insurance: model building and cases study' (in Chinese), *Commerce & Management Quarterly,* vol. 5, no. 1, pp. 1-23.

Yap, C. S., Soh, C. P. P. & Raman, k. S. 1992, 'Information systems success factors in small business', *OMEGA International Journal of Management Science*, vol. 20, no. 5/6, pp. 597-609.

Yeh, Jih-Cheng 2003, *A Study of E-Learning of the Life Insurance Industry in Taiwan* (in Chinese), Masters thesis, Fu Jen Catholic University, Taiwan.

Zack, M. 1998a, 'An architecture for managing explicated knowledge', *Sloan*

Management Review, September.

Zack, M. 1998b, 'What knowledge-problems can information technology help to solve', in *Proceedings of the Fourth Americas Conference on Information Systems*, E. Hoadley & I. Benbasat (eds), Baltimore, MD.

Zack, M. H. 1999, 'Managing codified knowledge', *Sloan Management Review*, vol. 40, no. 4, pp. 45-58.

Zhao, F. & Bryar, P. 2001, 'Integrating knowledge management and total quality: a complementary process', *in Proceedings of the 6th International Conference on ISO 9000 and TQM*, April 17-19, pp. 390-395.

Zikmund, W. G. 2000, *Business Research Methods*, 6th edn, Dryden Press, Forth Worth.

Appendix

Appendix A Interview Information Sheet

Interview on Factors of Knowledge Management in Life Insurance Industry

Thank you for agreeing to be interviewed. I am Huang, Li-Su, a PhD. candidate of Curtin University of Technology in Australia and lecturer of Department of Finance at Transworld Institute of Technology.

This interview is a preliminary field study exploring the factors affecting the adoption and practice of knowledge management in Taiwan life insurance industry. Knowledge management has been an important issue for organizations to enhance competency in the increasingly competitive environment. In particular, I am studying how the external factors, such as environments, IT infrastructure, as well as organizational and cultural characteristics would affect the adoption and practice of knowledge management through people's perceptions in terms of perceived usefulness, complexity and subjective norm.

All responses will be kept confidential and the anonymity of the interviewee will be respected and protected. This interview will take between 30 and 45 minutes to finish, and may be audio taped, subject to your approval. Allocating identification numbers to transcription of this interview will protect anonymity of data source. Participation is voluntary and the participants are at liberty to withdraw at any time without prejudice or negative consequences. This exploratory interview project has been approved by the School Research Ethics Committee.

Should you have any concern in regards to this meeting following this interview, please contact me at 05-5321490, 0920096621 (email: lisu@mail.tit.edu.tw); or my supervisor, Professor Mohammed Quaddus, Graduate School of Business, Curtin University of Technology, 78 Murray Street, Perth 6000, Western Australia (Tel: +618 92662862; email: Mohammed.Quaddus@gsb.curtin.edu.au); or the Research Ethics Committee (Secretary), Curtin University of Technology, 78 Murray Street, Perth 6000, Western Australia.

Appendix B Interview Protocol

(Semi-structured interview guide)

BACKGROUND QUESTIONS

What type of life insurance enterprise is your organization?
(Is it a foreign or local life insurance enterprise?)

How many staff are there in your organization?
(Ranges will be specified if the participant is reluctant to answer)

What is your position in the organization?

How long have you been in the organization?

How long have you been in the life insurance industry?

Does your organization adopt or/and apply knowledge management?

What is, if any, the major knowledge management project, strategy or procedure in your organization?

GUIDING SEMI-STRUCTURED QUESTIONS

KM* Perception and Practice
Q.1. What is your perception of knowledge and knowledge management?
What do you think are the main activities involved in knowledge management?

Intention to Adopt KM
Q.2. What would encourage you to consider the adoption of knowledge

management?
What are the incentives?
What should be done before making the decision to adopt knowledge management?

Q.3.What do you think are the main factors that may influence people's intention to adopt knowledge management in your organization?
(E.g., improving job performance, easy to learn and use, pressure from other people, etc.)?

Q.4. What would influence people's perception of knowledge management?
(E.g., competition, individual characteristics, IT* infrastructure, organization, culture, etc.)?

Q.5. What would encourage people to adopt and apply knowledge management?
(E.g., customer demand, security of data, knowledge manager, explicit strategy, culture)?

Q.6. What do you think are the barriers to adopt and apply knowledge management in your organization?

Perceived Usefulness (PU)*
Q.7. What are the benefits of knowledge management to you?
How can knowledge management help you to perform your job better?

Complexity
Q.8. What would enable you (or make you feel easy) to adopt and implement knowledge management?
What would make you feel difficult to adopt or apply knowledge management?

Subjective Norm (SN)*
Q.9. Do you think that the adoption and application of knowledge management is a normal practice in the insurance industry?
How would you be affected by your competitors' adoption and application of KM?

Q.10. What would make people more willing to adopt and apply knowledge management?

· Link between PU/complexity/SN and intention to adopt KM

· Link between intention to adopt KM and practice of KM

· Link between complexity and PU

Q.11. What would prevent people from adopting and applying KM?

Q.12. What needs to happen (i.e., put it into place) to adopt KM?

· Link between environments/individual/IT/organization/culture and PU/Complexity/SN

Perceived Expected Performance

Q.13. How do you see the adoption of knowledge management would improve your organizational performance?

Q.14. How do you see the practice of knowledge management would affect your organizational performance?

· Link between KM practice and perceived expected performance

Thank you.

*note:

KM: knowledge management

IT: information technology

PU: perceived usefulness

SN: subjective norm

Appendix C Interview Transcript for Company A

A (Interviewer): Li-Su Huang
B (Interviewee): XXX
Date: 6 December, 2005

A: The content of the interview will be kept confidential and the anonymity of the interviewee will be protected. This interview will take between 30 and 45 minutes to finish.

A: At first, I would like to ask that, "Are you willing to accept my interview and taping?"
B: Yes, I do.
A: Thanks.
A: This research is regarding KM. Basically, KM refers to some aspects, such as "the Second Generation Operation System" which we had in our company before, customer data management and process simplification.
B: We are now using "the Third Generation Operation System". Besides, the company is still promoting the simplification of operation process. Process simplification is never ending. Whenever you find any problems in process, you may point them out. Our company provides bonus to encourage the executive employees to propose their ideas or suggestions. However, most of our executive employees can only address their thought orally. It would be difficult for them to write the computer formula. They may write a proposal stating the problems to the related departments, but not the information system formula.
A: We can say that the range of KM is broad and covers all the activities regarding knowledge identification, knowledge gathering and knowledge usage. Those activities would include establishing customer data, providing operation processes, sharing knowledge between different departments and branch offices. The sales managers can share their experiences to new sales persons. In addition, how to use IT and other tools to effective manage knowledge is also an important issue in KM.
A: So, may I know if our company is a local company?
B: Yes
A: Then, how many staff are there in our company?
More than 1000, including those especially trained for phone sales in the "Call

Center". We could say that we have about 900 office staff in this company.

A: Excuse me, may I ask your present position?

Chief of the Customer Service Section. The original "Policy Section" and "Customer Service Section" were combined into the "Customer Service Section", which deals with underwriting, claim, policy alteration, policy loan, customer complains, and group insurances.

A: How long have you been in our company?

B: 1983 until now. 22 years.

A: How long have you been in the life insurance industry?

B: I've been working in the same company since I started my job in life insurance industry.

A: Do you see if our company has any KM activities or projects? Have you ever heard about this term of "KM"?

B: KM? If CRM (Customer Resource Management) System can be a part of KM, the Customer Service Department is now developing this system. Our company hired a professional person who is in charge of this area. It is only in the stage of development and not finished yet. Because our company is kind of old, managing the data of our customers is very important. The system can provide our related enterprises some information of our customers and they may use the data with the content of the customers. Our company can use the data, e.g., for doing the phone promoting in the "Call Center".

A: It looks like almost every life insurance company has been developing the CRM system?

B: Yes. It is quite amazing now. When I just entered this industry, we could use a system for years. But now, if you do not do it in 3 to 5 years, you will fall behind and eliminated. That is why everybody is so distressful. We feel like we can never learn enough. The knowledge changes in 3 to 5 years. Like now, we have web meeting on line for many years.

A: So, you don't have to travel for conferences like before?

B: No, we don't have to. We can have the meetings no matter which cities you are in. We can see one another from the screen. Some case study regarding insurance claim can be done in this approach, too. Some other courses of the reinsurance companies were done by web meeting, but the result was not so good. The reason could be that the equipment we used was not the newest and thus we could not see the power point files at the same time.

B: In addition, we had online learning system after you left our company. Nevertheless, the system failed finally.

A: I would like to know the reason and will ask you later in our interview. Anyhow, it is quite progressed now.
B: Yes, but the employees have great pressure, and more and more jobs.
A: Will that be because they need to do some work for knowledge management?
B: Sort of.
A: After the data is established, isn't it easier for them to do the job?
B: Yes, of course. So, fewer and fewer people are needed (laughing). Therefore, as a manager, I always try to create a better and warm working environment for the employees to work happily. Otherwise, it is very hard to work with so much pressure. It is regulated that we work from 8:30 am to 6:00 pm, but nobody can leave the office on time and we make it a goal to leave here at 7:00 pm.
A: I understand (chatting about the working pressure). Then, I would like to move on to the following questions, though you have answered some of them in our talk above.
A: In general, when we talk about "knowledge", what do you see "knowledge"? Like what you have told me, some knowledge was not there when I was here. The knowledge has been deeply embraced in your mind. Have you ever imagined what the company would lose if you leave the company? A person who knows so many things just disappeared?!
B: The so-called "knowledge" in my point of view is "professional knowledge", e.g., the profession skills in underwriting and claim. The company will have lost when an underwriter of claim officer leaves. However, that could be recovered by having the design of "transmission". We will train a so-called "backup" person to do the affairs while the major officer is absent. Besides, job rotation can be an effective approach for preventing the loss. In other words, if we cannot undertake more that two tasks, we could have trouble.
A: In terms of CRM, web meeting, online learning system, process simplification, etc., can we use those to learn from the operation processes of other departments or branch offices?
B: The problem does not exist now, because the operation processes have been standardized. You may only provide your suggestion to the related department. If your suggestion is accepted, the related department will revise the process and inform all related departments.
A: So, the problems resulting from the various processes in different departments have been solved?
B: Yes. In addition to that, we have "ISO Verification System", which helped us to manage our process and documentation. In this system, all the processes and

documents need to be reviewed every year and be revised if there are any changes occurred. The system is now in our computer system and we can log in to see the content, but not be able to print it out. Only our employees can log in this system.

A: It sounds like everyone can do a new job easily with this system.

B: Yes, you are right. In my department, I would ask the employees to write a "tip book" for other "backup person" to do the job smoothly.

A: The job is getting more and more challenging. You must have worked so hard.

B: We've had ISO for two more years. At the beginning, it took a while to establish all the processes and documents, but it became easier later with the processes and documents available. You know? In such a competitive market, all departments would provide our sales persons and customers the best service and everything they need.

A: Accordingly, in these KM related activities, the first step would be to identify the "knowledge". However, before that, what would motivate the adoption of KM?

B: In terms of CRM system, it is produced by the trend of changing world. Because other companies in the market have it, you will be out of the market if you are not going to have it. Moreover, the vision of our senior manager plays an important role.

A: If you feel any inconvenience, I may shut off the recorder.

B: Not at all. No problem.

A: Let me put it this way. KM has been done for years in Taiwan, e.g., how to manage the knowledge in high-tech industries. Their major three KM activities are: (1) identifying the important knowledge, that is, to find the knowledge which needs to be managed; (2) establishing the data base, such as keying in the data and the employees' providing their knowledge by writing down their thoughts; and (3) using the knowledge to provide customers services. Do you think that our company has got the third step?

B: In CRM system, we can only say that our company is using it internally, while not using it to serve our customers' needs. We use data mining in this system for giving our Call Center specific groups of customers for promoting different products. The main purpose is "marketing".

A: How about the competitor's information? Is there anyone who is in charge of this affair to gather the information of other companies, such as their operation or products?

B: This is called "Standardization of the market". For example of underwriting, some sales persons would complain that some other companies would accept the policy, while our company cannot. They would ask our company to provide a

"standard" and let them know the reasons. The related departments gather the information by visiting other companies for experience exchange as well as enquiries via phone. For instance, we have an "Insurance Policy Scan System". In order to build up this system, we not only interviewed some companies via phone for the market survey, but also went to see their practical operation.

A: As you may have known, these activities take time and efforts. Lots of human and financial resources should be put in to implement KM. What do you think the incentives for the organization to do these activities? What would encourage the initiation of the activities?

B: The first reason is the trend. The second is the competitive pressure. The third is to enhance the performance of the employees, such as time saving. For example, once the insurance policies are scanned, we can see the policies from computer, rather than ask someone to find the original policies for us. We can check the signature and stamp right from the computer. This is quite convenient. In the trend that KM has been applied in many organizations, adopting KM would help improve our performance at work and let us feel more competent.

A: What you have told me is very precious, and just verified many opinions from various references.

B: It is actually what we've done practically.

A: What preparation should be done before implementing the KM activities successfully? How about testing?

B: In terms of online learning system, our company first asked our needs and designed the content. It was proposed that the employees lack the understanding regarding the new "investment-typed insurance products". Therefore, our company design many relevant courses and the employees can attend the courses on line. Whenever a new product is taken into the market, a test will be there in the online learning system.

B: Did that work well?

A: The employees would review the product on line. The initial purpose was quite good. However, the other courses developed later just failed.

A: Excuse me. Let me get back to the original question. Before developing this system or making the decision, did the company have conferences for discussion, or ask the employees for their opinions?

B: No, it was mainly designed by the Training Department. It only asked for our needs of the courses.

A: I see. Do you think that it would be better to have a test before implementation?

B: Do you mean to have a test after attending the courses?

A: Ya.

B: I think that it is ok without the test. I don't think that the test would make it more effective. Meanwhile, I think that reason why the system finally failed was that everybody was too busy. Though the courses might be very good, the employees just did not have time to use them.

A: Then, I would like to ask the third question and I have total 14 questions. In fact, the questions were made according to theories and empirical studies. From literature, it is indicated that a person' behavior is decided by some major factors. From a personal perspective, what would influence your implementing the KM activities? (e.g., improving job performance, easy to learn and use, etc.)

B: In KM, the main reason why the Customer Service Department would develop the CRM system is to assure the accuracy of the data of policies. It has been revising the data since the old system was transformed to the Second Generation Operation System and there was a bunch of errors. If the data in the CRM system is correct, it would be very useful for us. Also, to protect the data of the customers is important.

A: so, you don't think that Ease of Use is very important?

B: It did not need much effort to learn it. As a user, we only used it rather that designed it. A: How about wring the proposal of process simplification? Will you feel uncomfortable to do it since there is so much administrative work to do?

B: Not really. Only when some people who are in lack of innovativeness, they would be reluctant to do it. They just want to stay where they are and don't want to do any changes.

A: Innovativeness is also indicated from literature.

B: Yes, when you have done a job for a period of time, you will lose the innovativeness. Most of the employees would have this thought.

A: How about the pressure from other people?

B: It would have some impact. For instance, if some managers in other departments have suggestive proposals, you will have pressure if you don't have.

A: From co-workers or managers?

B: Both.

A: All right, next question. In this research, I also would like to explore the external variables which would affect perceived usefulness or other people's impact. What do you think the factors affecting the employees' accepting these KM activities?

B: The most important is "attitude" and "enthusiastic" to work, as well as the loyalty to the company. A new employee will not care about this at all when he or she doesn't like here and wants to leave this company. It would be hard to let him/her do it. Team work is important. In our company, attitude is more important than

IQ.

A: How about age?

B: No. In our company, age is not a main concern.

A: Gender?

B: No.

A: Education? Some research argued that people who have higher education have less willingness to share their knowledge.

B: Yes, but in my department, our education is not too high, so we don't have this problem. Nevertheless, we heard about that from other departments.

A: Position?

B: Yes. Besides, it dependents on which work domain that you are in charge of. In most cases, managers will care more about it.

A: Tenure?

B: It is ok in our department. But it could be said that the employees who have longer tenure will have more loyalty to the company.

A: This is not mentioned clearly in Western literature. How about computer skill or background?

B: It is related. It would influence their acceptance.

A: Then, how about external competition?

B: It definitely has impacts. All the competition between companies, departments or persons will give use pressure. For example, we need to attend some seminars among companies and we have no choice to compare with others.

A: How about external environments and regulations?

B: It is the same. Especially regulations, our company has been putting emphasis on this area very much. We were just asked to three related seminars for this issue. In my case, there are more and more complaints and arguments from customers and those are related to regulations.

A: Is that all?

B: Yes.

A: In my research, IT could be one of the main factors. What kind of important characteristics in IT would let you be willing to undertake KM? (e.g., access to customers' data, integrated database, integration between different departments, or communication between departments/companies via IT)

B: Among the companies, we have an information system from the Life Insurance Association. Internally, all the information is in our system, but we can have the access only if we have the authority code.

A: Let's put it this way, when our company developed the Second Generation

Operation System, in your opinion, what should be done to make it make it useful?(e.g., they should know our practical operation, or the system should adapt to changes)

B: Those were done. Before development, they would ask about our needs. Actually, they knew our needs usually because we would complain to them whenever we had problems.

A: How about the hardware equipment and the size of the system?

B: Our system size was not enough, so we will have a new one and the monitor was changed one week ago. We could not do searching in the Policy Scan System because the system size was not big enough. Whenever we searched the data by the request of our sales persons, the system shut down. So, we told our company that we had this problem. The company thus evaluated it and bought a new one. So, it is important to have the infrastructure to support the system. Our system was built up early but we found the system would shut down for not having enough base. It was recovered later.

A: In promoting KM, what would have influences? (e.g., compatibility and function)

B: They are important.

A: Trialability?

B: They always do the test in parts. It should be done to have overall testing. However, it is not feasible in considering time and other reasons. Some of our systems failed for putting into place too rush. The result was bad.

A: Do you think different transfer channel, such as online learning, meeting or training, will have impact?

B: Yes, meeting or training physically will let us have opportunity to practice immediately. Let me take the example of PKI system. It was not tested until yesterday, whereas we were required to start to use it this morning. It was in such a hurry. If the advertisement has been sent out and customers come to ask about it, we would have problems and this is not a good thing at all.

A: How about guideline and directions?

B: It is very important, too. In addition, the timetable is essential. What should be done in each step should be clear.

A: Do you have a manager who is in charge of the KM activities?

B: No, it still in different departments. (Not necessarily in IT department) It's better to have one.

A: How about vice president or senior managers stating that we are doing KM?

B: No. There is no specific person/department for this.

A: Do you think that your participation in developing KM is important?

B: It is ok. I just use it. It doesn't matter if I've participated.

A: I've taken you too much time, let me just ask you two more main questions.

B: No problem.

A: Do you think that the size and structure of a company would have affect KM acceptance?

B: The size will have impact. In terms of structure, when doing CRM system, we would respond to the company when we had problems. The company would not force us to do everything. It is quite all right.

A: So, how about vision and strategy of the organization?

B: Those are important. We were asked to memorize the objectives, goals, etc.

A: How about organizational learning?

B: It has impact.

A: How about the support of time and space?

B: As long as the company requires us to do, we need to find the time by ourselves (laughing again), but it would be better to have that.

A: Is it also related to the support of top management and financial/human resources?

B: Yes.

A: Do you think that it is important to have someone to evaluate the results (performance of KM)?

B: Very very important. Nobody will do it sincerely without evaluation.

A: Is there an evaluation system now?

B: It would be difficult to evaluate this part. I don't even know which department is doing it. Only ISO has regular evaluation. It is possible to have evaluation only if some figures are available; otherwise, it is hard to evaluate.

A: How about reward or promotion/higher salary?

B: It depends on individual attitudes. If a person is eager for the knowledge, he/she will go for it no matter there is reward or not. I don't really care about it. Since the company has paid for different training courses, it is all right for us to attend it even there is no reward. You know? Most of the seminars are held on weekends.

A: The last one is culture. For example, foreign companies may have the culture of more competition. What do you think about it?

B: Of course.

A: In our company, we have so-called "5 Certification Activity" to encourage employees to get the professional certificates. It is not mandatory for all. Only two of them are required and other three are encouraged by our Human Resource Department.

A: How about the emphasis of our company on knowledge?

B: Very much.

A: How about team work?

B: Of course, our company wants to have the atmosphere of team work. However, most people will have "departmentalism" (selfishness). It is all right in our department, but some people in other bigger departments will not do whatever which is not his/her original job.

A: Loyalty? If the company would lay off employees, why would I give all my knowledge to the company?

B: Loyalty is very important, especially in the Electronic Business Department. This issue is not so serious in our department; you may ask someone in the IT department.

A: I will. Then, how about the obstacles?

B: No motivations? There are still some people who do not want to do it. They think that they do not need to do more because the salary is still the same and the pay is not high anyway.

A: The first part is almost finished. Then, what do you see these activities will improve your job performance (e.g., time reduction, increase of productivity, etc.)?

B: The first one would be enhancing the service quality for customers.

A: In addition to customer service, how would you feel that doing KM is useful for you?

B: The first part is still "service". I have both internal and external customers. My internal customers are our sales persons. I hope that I can give them the information they need – in time and correct information. The same is to the external customers.

A: How about job performance enhancement?

B: It is related. If you can manage well, your work quality will be better.

A: Work quantity?

B: It is still related.

A: Time reduction or making it easier to provide services?

B: All related. We can do the work more efficiently.

A: Will it make you feel more competent and confident?

B: Yes.

A: Would you think about promotion when you are doing it?

B: No. I won't think about that immediately.

A: May I ask about ease of use? What would make you feel easier to use it?

B: If it is relevant to my work or can improve my work, I will do it. Say, if the course is related to EQ (emotional quality), I will attend it because I think that EQ is

essential at work.

A: Do you care about whether it is easy to learn and use, or say, the time of using it?

B: In the process of learning, if nobody can help me to solve my problems right away, it will make it very difficult…

A: We talked about the people who would influence you, such as co-workers and managers.

B: I think co-workers or other managers at the same level will have more direct impacts.

A: Are you intending to do the KM activities?

B: As long as I have the ability, I will. If I don't have enough ability but the company requires us to do, I will look for assistance and still do it.

A: Will you do it in the coming few months?

B: If it is required by the company and will improve my job, I will definitely do it.

A: From the perspective of an organization, what do you see the performance that KM can bring to it?

B: Performance?

A: The performance may be visible or invisible.

B: In fact, the main reason for the organization to do it is "marketing", such as sales growth. This is the most important purpose. In addition, better customer service is one of the advantages of this system.

A: How about cost reduction?

B: So so. Not really.

A: Profitability? Sales growth doesn't guarantee the increase of profits, right?

B: In terms of cost reduction, it is argued that, if the Call Center succeeds, the company can save money by saving the commission to the tradition sales persons.

A: How about market share?

B: Do you mean performance? Because there are too many call centers in Taiwan and Taiwanese people are so afraid of being cheated (fraud), people do not accept it in general. In our company, whether the center succeeds or not is still a question mark in our company.

A: Can it improve the operation efficiency and service quality?

B: Yes.

A: How about development of new product and service?

B: (Stop a little while)…Yes. The system can help sorting out the specific group and suitable products can be developed for them.

A: So, this system can also help the company to adapt to changes?

B: Yes.

A: Do you think that the organization can have immediate influences on its performance by adopting KM?

B: No. You cannot see the influences right away. It is like adjusting the situation of our bodies. It takes time.

A: In the past ten years, what do you see the benefits by doing this?

B: Honestly speaking, our company did not start the emphasis on this area until two years ago.

A: So, it's still hard to see the performance?

B: Yes. We've just started to key in some detailed information about customers from last year.

The details regarding why the customer buys the insurance, and whether they buy the insurance for being introduced by their friends or the sales persons in our company, etc., haven't been paid attention to until lately.

A: In my research, I also would like to find the relations between external variables and the perceived usefulness. What do you see the major potential factors of perceived usefulness?

B: Individual characteristics. It is beneficiary for individuals if the quantity of sales increases. In addition, while using it, our performance of service will also be improved.

A: How about external pressure?

B: Yes, it will have impacts.

A: IT infrastructures or KM managers/transfer channel?

B: It is for sure that it is easier to implement it if someone is promoting it. If the managers do not do anything to promote it, the result will be poor. If some activities are promoted and posted in our emails everyday, it will make a lot of differences.

A: So, do you think that organizational characteristics and culture have influences?

B: Yes, they do.

A: Do you think environment (external competition) will have affected your feeling about ease of use?

B: No.

A: Individual?

B: Yes, as a user, it does matter.

A: Anyone who promote KM?

B: In using it, it seems that it is necessary that someone is promoting it.

A: Culture?

B: No.

A: Do you think that attitude toward knowledge management is affected by perceived usefulness?

B: Yes, of course. You will not do it if it is useless.

A: How about whether it is easy or difficult to use?

B: It is not that important, but still has some influences. For instance, we have a system which is very difficult to use and the sales persons refused to use it eventually.

A: The pressure from other people?

B: Yes.

A: Though the following question is a little hard to explain, may I ask you if ease of use has impacts on perceived usefulness?

B: Are you asking that: if a system is very hard to use, will I still use it? I will use it if it is required by the company even though it is so difficult to use. But, we will try to express our ideas to the related departments and they will revise it. The original purpose of the system which I just mentioned was good, but it failed because it was too difficult to use and could not be accessed anytime. The system was not accessible after a certain period of time.

A: Do you think the attitude toward KM will influence the practice of KM?

B: Yes, of course.

A: Do you think undertaking KM activities will have impacts on the organizational performance in the future?

B: It depends. Some of them failed in our experiences. It is impossible that everything will be better by doing this. We cannot even see the impact of CRM system on our customer services at present because the sales performance of our Call Center is not good.

A: Will our customers give us more compliments because our company is more improved?

B: This is hard to be quantified. When the customers think that we have better service, they do not speak it out. On the contrary, they will complain when they are not satisfied with our services. Therefore, it is hard to quantify some implicit performance. Actually, we are providing better services to customers, such as sending them the outline of their policies. That is also part of customer resource management.

A: Do you mean that it is hard to see the performance immediately? Is there in lack of specific figures/indexes for the company to know the impact of KM?

B: Yes. It is mainly for the long-term improvement in service and operation processes.

A: So, the vision of the organization is important, isn't it?
B: Yes, it is. Like our President Chu, he always has the vision for the long run.
A: The interview is finished. Thanks so much for your participation.

Note:

1. Comments from the interviewee:

A: All right, finally, could you please give me some suggestions for improving my interview? Was there anything unclear during the interview?

B: It was just fine. Whenever I stopped for a second, it meant that I did not follow the question or I did not totally understand what should be answered. But you've guided me throughout the interview, so I could keep going on. No problem at all.

2. Adjustments that would be made based on the feedbacks from this pre-test interview:

When the interviewee was not so familiar with the term of KM, the questions should be asked by referring to some specific KM related activities.

3. Field note:

1. The office was a little crowded and all full of computers and other equipments.
2. The staff were in great pressure at work and felt insecure since they were afraid of being laid off.
3. The employees expressed that they had no choice but to accept and get used to changes because it was very hard to find a new job.

4. **Data Analysis:**

The interview transcript was coded manually and the results via the content analysis approaches are presented in Table 6-2 and Table 6-3.

Appendix D Survey Cover Letter

Date

Mr./Ms. XXX
XXX Department
XXX Life Insurance Company
Address

Dear Mr./Ms. XXX,

My name is Huang, Li-Su, a Ph.D. candidate of Curtin University of Technology in Australia. I am conducting academic research under the supervision of Professor Mohammed Quaddus. I used to work in the life insurance industry in Taiwan for years and then taught in college.

Knowledge management has been an essential topic for organizations to enhance competency in the competitive environment. In particular, I attempt to examine the adoption and practice of knowledge management in the life insurance industry in Taiwan.

I would like to ask if you would be kind enough to assist me in this research. I understand that you have been extremely busy, but your assistance would be most appreciated contributing towards the knowledge and education about knowledge management applications in Taiwan life insurance industry.

Enclosed are the questionnaires which I would like to administer to the office staff and managers. I would be really thankful if you would encourage your colleagues to answer the questionnaire, which takes about fifteen minutes to finish. This research questionnaire has been approved by the School Research Ethics Committee. All responses will be kept confidential and the anonymity of the respondents will be respected and protected.

Should you have any further queries, please feel free to contact me at 0920-104078 or email to Li-Su.Huang@gsb.curtin.edu.au. If you would like to know the results of this survey, please leave your correspondences on the last page of questionnaire. The summarized results will be sent to you after the study is finished. Any additional comments will be highly appreciated.

Sincerely yours,

Ms. Li-Su Huang
Ph.D. Candidate, Graduate School of Business, Curtin University of Technology
78 Murray Street, Perth 6000, Western Australia, Tel: +618 92661165
Email: Li-Su.Huang@gsb.curtin.edu.au

Supervisor: Professor Mohammed Quaddus
Graduate School of Business, Curtin University of Technology
78 Murray Street, Perth 6000, Western Australia, Tel: +618 92662862
Email: Mohammed.Quaddus@gsb.curtin.edu.au

The Research Ethics Committee (Secretary)
Curtin University of Technology
78 Murray Street, Perth 6000, Western Australia

Appendix E Survey Follow-up Letter

Date

Mr./Ms. XXX
XXX Department
XXX Life Insurance Company
Address

Dear Mr./Ms XXX,

My name is Huang, Li-Su, a Ph.D. candidate of Curtin University of Technology in Australia. Under the supervision of Professor Quaddus, I am presently conducting academic research into knowledge management adoption and practice in the life insurance industry in Taiwan.

I sent the questionnaires which I would like to administer to the office staff and mangers to you two weeks ago. If you have received and kindly distributed them, please accept our heartily thanks for your time and help.

The questionnaires were attached with self-addressed and stamped envelopes. If there are some questionnaires which have not been returned, I would be very grateful if you would allow your colleagues to complete the questionnaire and send back to us as soon as possible. For your convenience, I attach some other copies of the questionnaire and paid envelopes in this letter.

This research questionnaire has been approved by the School Research Ethics Committee. All responses will be kept confidential and the anonymity of the respondents will be respected and protected.

Thank you very much for your kind assistance. Should you have any further queries, please feel free to contact me at 0920-104078 or email to Li-Su.Huang@gsb.curtin.edu.au. If you would like to know the results of this

survey, please leave your correspondences on the last page of questionnaire. The summarized results will be sent to you after the study is finished. Any additional comments will be highly appreciated.

Sincerely yours,

Ms. Li-Su Huang
Ph.D. Candidate, Graduate School of Business, Curtin University of Technology
78 Murray Street, Perth 6000, Western Australia, Tel: +618 92661165
Email: Li-Su.Huang@gsb.curtin.edu.au

Supervisor: Professor Mohammed Quaddus
Graduate School of Business, Curtin University of Technology
78 Murray Street, Perth 6000, Western Australia, Tel: +618 92662862
Email: Mohammed.Quaddus@gsb.curtin.edu.au

The Research Ethics Committee (Secretary)
Curtin University of Technology
78 Murray Street, Perth 6000, Western Australia

Appendix F Questionnaire (English Version)

Research Questionnaire on Knowledge Management Adoption and Practice in Taiwan Life Insurance Industry

Dear Sir/Madam,

In order to examine the applications of knowledge management in Taiwan life insurance industry, this questionnaire was designed to study how the external factors would affect knowledge management adoption and practice through the employees' perceptions.

I would be very grateful if you could spend about fifteen minutes completing the questionnaire. Your answers would be valuable for this study and there is no right or wrong answer. Please answer the questionnaire to the best of your knowledge. The questionnaire is anonymous. Participation is voluntary and the participants are at liberty to withdraw at any time without prejudice or negative consequences. All responses will be used simply for academic research analysis and the access is limited to the researcher and supervisors. Only summarized results will be presented and will not identify any particular individual. This study has been approved by the Curtin University Human Research Ethics Committee. If needed, verification of approval can be obtained by either writing to the Curtin University Human Research Ethics Committee, c/- Office of Research & Development, Curtin University of Technology, GPO Box U1987, Perth 6845, or telephone 9266 2784.

Should you have any queries, please feel free to contact me at 0920-104078 (email: Li-Su.Huang@gsb.curtin.edu.au); or my supervisor, Professor Mohammed Quaddus, Graduate School of Business, Curtin University of Technology, 78 Murray Street, Perth 6000, Western Australia (Tel: +618 92662862; email: Mohammed.Quaddus@gsb.curtin.edu.au); or the Research Ethics Committee (Secretary), Curtin University of Technology, 78 Murray Street, Perth 6000, Western Australia.

Thanks and Best Wishes.
Sincerely yours,

Li-Su Huang, PhD Candidate
Supervisor: Professor Mohammed Quaddus
Graduate School of Business, Curtin University of Technology

Definition

For the purpose of this study, the definitions are used as follows:

Knowledge: It is an individual's interpretation of information based on personal experiences, skills and competencies. The knowledge in the life insurance industry constitutes the familiarity and professional capability in underwriting, claim, customer service, products, etc.

Knowledge Management: The process of gathering, organizing and using individual and collective knowledge to support the firm becoming more competitive, e.g., sharing experience, establishing knowledge bank, etc.

Please answer the following questions by having a check (∨) in the space (□) provided to express your opinion on each statement.

Section 1: External Factors

1. To what extent do you agree that the following **"environments and industrial factors"** would influence a person's perception of knowledge management ?

Please indicate the extent to which you agree with each statement by checking the appropriate number from 1 to 7 in the space provided.		Strongly Disagree			⟷			Strongly Agree
		1	2	3	4	5	6	7
1.	High competition in the life insurance industry.	□	□	□	□	□	□	□
2.	Trend of time and the emphasis on KM in various industries.	□	□	□	□	□	□	□
3.	Strict regulations of the government upon the life insurance industry.	□	□	□	□	□	□	□
4.	Increasing numbers of customer complains and disputes.	□	□	□	□	□	□	□
5.	Prosperity of IT industry in Taiwan.	□	□	□	□	□	□	□

6.	Too many documents involved and a mass amount of paper used in the life insurance industry.	□	□	□	□	□	□	□

2. To what extent do you agree that the following **"individual characteristics"** would influence a person's perception of knowledge management ?

Please indicate the extent to which you agree with each statement by checking the appropriate number from 1 to 7 in the space provided.		Strongly Disagree			⟷			Strongly Agree
		1	2	3	4	5	6	7
1.	Educational background.	□	□	□	□	□	□	□
2.	Job position.	□	□	□	□	□	□	□
3.	Work domain (e.g., mundane work or highly professional job).	□	□	□	□	□	□	□
4.	Computer background and skill.	□	□	□	□	□	□	□
5.	Individual innovativeness (e.g., willingness to make and accept changes).	□	□	□	□	□	□	□
6.	Work attitude.	□	□	□	□	□	□	□
7.	Personality (e.g., activeness and passiveness; enthusiasm and conservativeness).	□	□	□	□	□	□	□
8.	Habit of using computers and internet (e.g., how much time spent on computers and internet each day).	□	□	□	□	□	□	□
9.	Loyalty and sense of belonging in the company.	□	□	□	□	□	□	□

3. To what extent do you agree that the following **"information technology support"** would influence a person's perception of knowledge management ?

Please indicate the extent to which you agree with each statement by checking the appropriate number from 1 to 7 in the space provided.		Strongly Disagree			⟷			Strongly Agree
		1	2	3	4	5	6	7
1.	Hardware infrastructure (e.g., sufficient	□	□	□	□	□	□	□

	server capacity, bandwidth and advanced equipment to provide a speedy and stable platform).							
2.	Software infrastructure (e.g., well-planned system and friendly-to-use software).	□	□	□	□	□	□	□
3.	Correct and integrated information.	□	□	□	□	□	□	□
4.	Compatibility with the practical operation.	□	□	□	□	□	□	□
5.	Providing various functions according to the needs.	□	□	□	□	□	□	□
6.	Data updating and maintenance.	□	□	□	□	□	□	□
7.	Testing and appropriate adjustment.	□	□	□	□	□	□	□
8.	Security of data and system.	□	□	□	□	□	□	□
9.	Cooperation and communication between the IT personnel and the users.	□	□	□	□	□	□	□
10.	Fun and interesting design (e.g., games).	□	□	□	□	□	□	□

4. To what extent do you agree that the following **"knowledge management promotion"** in an organization would influence a person's perception of knowledge management？

Please indicate the extent to which you agree with each statement by checking the appropriate number from 1 to 7 in the space provided.		Strongly Disagree						Strongly Agree
		1	2	3	4	5	6	7
1.	KM manager.	□	□	□	□	□	□	□
2.	KM plan or project, including the budget and relevant worker distribution.	□	□	□	□	□	□	□
3.	KM team.	□	□	□	□	□	□	□
4.	Top management support for KM.	□	□	□	□	□	□	□
5.	Human and financial support.	□	□	□	□	□	□	□
6.	Transmitting the mission and benefits of knowledge management.	□	□	□	□	□	□	□
7.	Time schedule and guidelines	□	□	□	□	□	□	□
8.	Training, introducing the concept of	□	□	□	□	□	□	□

	knowledge management and providing the basic skill needed.							
9.	The department representatives can participate in the KM meetings, to have good opportunities for expression and discussion.	□	□	□	□	□	□	□
10.	Support of time and space (e.g., reducing original workload from the personnel in promoting knowledge management).	□	□	□	□	□	□	□
11.	Knowledge transfer channel (e.g., interpersonal or mass-media approach).	□	□	□	□	□	□	□
12.	Knowledge type (e.g., documents or personal experience).	□	□	□	□	□	□	□
13.	Reward for KM, including monetary and spiritual encouragement (e.g., bonus, plaque or advancement).	□	□	□	□	□	□	□
14.	Evaluation on KM performance (e.g., competition or ranking).	□	□	□	□	□	□	□

5. To what extent do you agree that the following **"organizational characteristics"** would influence a person's perception of knowledge management ?

Please indicate the extent to which you agree with each statement by checking the appropriate number from 1 to 7 in the space provided.		Strongly Disagree			⟷			Strongly Agree
		1	2	3	4	5	6	7
1.	Size of organization.	□	□	□	□	□	□	□
2.	Structure of organization (e.g., no. of hierarchy, centralization or decentralization).	□	□	□	□	□	□	□
3.	Vision, value and objective of organization.	□	□	□	□	□	□	□
4.	Strategy and policy of organization.	□	□	□	□	□	□	□
5.	Organizational learning system and environments.	□	□	□	□	□	□	□
6.	The system for duty rotation and acting duty.	□	□	□	□	□	□	□
7.	Employee turnover rate.	□	□	□	□	□	□	□

8.	History of organization (e.g., new entrant or existing company).	□	□	□	□	□	□	□
9.	Type and number of the marketed products of the company.	□	□	□	□	□	□	□

6. To what extent do you agree that the following **"cultural factors"** would influence a person's perception of knowledge management ?

Please indicate the extent to which you agree with each statement by checking the appropriate number from 1 to 7 in the space provided.		Strongly Disagree			⟷			Strongly Agree
		1	2	3	4	5	6	7
1.	Seeking, offering and sharing knowledge is encouraged.	□	□	□	□	□	□	□
2.	The harmony and operation of team work is emphasized.	□	□	□	□	□	□	□
3.	The relationship of trust and commitment is valued.	□	□	□	□	□	□	□
4.	Employees and customers can feel respected.	□	□	□	□	□	□	□
5.	Employees are encouraged to explore and experiment.	□	□	□	□	□	□	□
6.	Employees are encouraged to ask others for assistance when needed.	□	□	□	□	□	□	□
7.	Employees are encouraged to interact with other groups.	□	□	□	□	□	□	□

Section 2: Perception of Knowledge Management

1. The following statements are associated with the "**perceived usefulness"** of knowledge management in enhancing the job performance:

★ I think that knowledge management is useful in improving my performance at job when it can…

Please indicate the extent to which you agree with each statement by checking the appropriate number from 1 to 7 in the space provided.		Strongly Disagree			⟷			Strongly Agree
		1	2	3	4	5	6	7
1.	Improve my work and service quality.	□	□	□	□	□	□	□
2.	Increase my work quantity.	□	□	□	□	□	□	□
3.	Save my time at work.	□	□	□	□	□	□	□
4.	Make it efficient at work.	□	□	□	□	□	□	□
5.	Make it easier to do the job.	□	□	□	□	□	□	□
6.	Allow more convenience and flexibility at work (e.g., information can be obtained at any time).	□	□	□	□	□	□	□
7.	Meet the needs at work and solve the problems.	□	□	□	□	□	□	□
8.	Increase the effectiveness in my saving, gathering and organizing data, as well as transferring my experience to others.	□	□	□	□	□	□	□
9.	Enhance my professional abilities.	□	□	□	□	□	□	□
10.	Reduce the mistakes that could possibly be made at work.	□	□	□	□	□	□	□
11.	Decrease the duplicate work which is unnecessary.	□	□	□	□	□	□	□
12.	Let me learn something that is hard to get from books (e.g., others' experience in dealing with cases).	□	□	□	□	□	□	□
13.	Increase the chances of obtaining a promotion or getting a raise.	□	□	□	□	□	□	□

2. The following statements are associated with the **"complexity"** of knowledge management:

★ I would feel that knowledge management is difficult to understand and apply if …

Please indicate the extent to which you agree with each statement by checking the appropriate number from 1 to 7 in the space provided.		Strongly Disagree			⟷			Strongly Agree
		1	2	3	4	5	6	7
1.	The associated information system is not friendly to use.	□	□	□	□	□	□	□
2.	It takes too much time to find the information needed.	□	□	□	□	□	□	□
3.	The message is not simple, clear and short enough.	□	□	□	□	□	□	□
4.	There is no immediate assistance when the problems occur.	□	□	□	□	□	□	□
5	The exact information or knowledge needed is not accessible.	□	□	□	□	□	□	□
6.	It is not easy to operate in practice.	□	□	□	□	□	□	□

3. The following statements are associated with the **"subjective norm"** that you would be affected by others in adopting and applying knowledge management:

★ I would adopt and apply knowledge management because (of) …

Please indicate the extent to which you agree with each statement by checking the appropriate number from 1 to 7 in the space provided.		Strongly Disagree			⟷			Strongly Agree
		1	2	3	4	5	6	7
1.	Pressure from colleagues or people in the same field who think I should adopt and apply knowledge management.	□	□	□	□	□	□	□
2.	No. of co-workers who adopt and apply knowledge management, and their comments.	□	□	□	□	□	□	□
3.	Supervisor's attitude and opinion.	□	□	□	□	□	□	□
4.	Encouragement of senior management.	□	□	□	□	□	□	□
5.	Influence of opinion leaders in the group.	□	□	□	□	□	□	□
6.	The company requires that employees should accept and apply knowledge management.	□	□	□	□	□	□	□

7.	Adopting and applying knowledge management can enhance a person's image, prestige or status in the company.	□	□	□	□	□	□	□

Section 3: Attitude toward Knowledge Management Adoption

1. The following statements would ask about your "**attitude toward knowledge management adoption**":

Please indicate the extent to which you agree with each statement by checking the appropriate number from 1 to 7 in the space provided.		Strongly Disagree ⟷ Strongly Agree						
		1	2	3	4	5	6	7
1.	Knowledge management is a good idea.	□	□	□	□	□	□	□
2.	Knowledge management makes work more interesting.	□	□	□	□	□	□	□
3.	Knowledge management is fun.	□	□	□	□	□	□	□
4.	I like knowledge management.	□	□	□	□	□	□	□

Section 4: Knowledge Management Practice

1. The following statements would ask about the **"practice of knowledge management"** in your organization:

Please indicate the extent to which each statement describes the frequency of knowledge management practice in your organization by checking the appropriate number from 1 to 7 in the space provided.		Extremely Infrequently ⟷ Extremely Frequently						
		1	2	3	4	5	6	7
1.	We gather knowledge from all different sources.	□	□	□	□	□	□	□
2.	We identify the knowledge that is important and useful.							
3.	We organize knowledge by classifying and	□	□	□	□	□	□	□

	integrating the gathered knowledge.							
4.	We share knowledge to others.	□	□	□	□	□	□	□
5.	We absorb and convert others' knowledge into our personal knowledge and skills.	□	□	□	□	□	□	□
6.	We apply knowledge in the practical work.	□	□	□	□	□	□	□
7.	Knowledge management becomes a part of our daily routine.	□	□	□	□	□	□	□

Section 5: Perceived Expected Performance

1. The following statements are associated with the "**perceived expected performance"** that knowledge management practice would bring to your organization:

★ I think that knowledge management practice will enhance the organizational performance in …

Please indicate the extent to which you agree with each statement by checking the appropriate number from 1 to 7 in the space provided.		Strongly Disagree		⟷				Strongly Agree
		1	2	3	4	5	6	7
1.	Improving customer service by providing rapid and accurate responses.	□	□	□	□	□	□	□
2.	Enhancing the efficiency in operation.	□	□	□	□	□	□	□
3.	Reducing cost, e.g., saving use of labor, paper and space.	□	□	□	□	□	□	□
4.	Having better ability to adapt to changes.	□	□	□	□	□	□	□
5.	Gaining better reputation and public praise.	□	□	□	□	□	□	□
6.	Improving the quality of workers.	□	□	□	□	□	□	□
7.	Providing managers with more information in making decision.	□	□	□	□	□	□	□
8.	Keeping the employees' work experience and knowledge in the company.	□	□	□	□	□	□	□
9.	Decreasing the impact and possible loss arising from employee turnover.	□	□	□	□	□	□	□

BACKGROUND：(Please check the appropriate response in the space provided.)

1. How long have you worked in the current company?
   □ Less than 2 years □ 2+ to 5 years □ 5+ to 10 years □ 10+ to 15 years
   □ More than 15 years

2. Gender:
   □ Male □ Female

3. Age:
   □ 20 or below □ 21-30 □ 31-40 □ 41-50 □ 51 or above

4. Position:
□ Vice President or above □ Assistant Vice President
□ Office Director □ Department Manager □ Associate Manager
□ Assistant Manager □ Division Chief □ Supervisor
□ Staff □ Others: _____

5. Job Description:
□ Underwriting □ Claim □ Marketing □ Customer Service
□ Policy Service (Policy Alteration, Loan, Surrender, etc.)
□ Premium (Premium Collecting and Bookkeeping)
□ Training □ Information Technology □ Accounting, Financial and Investment
□ Actuarial and Product Development
□ Human Resource □ Legal Affairs □ Registrar
□ Others:

6. Education:
   □ High School or equivalent □ Technical School □ Tertiary
   □ Master Degree or above

This is the end of the questionnaire.
Thank you very much for your assistance.

Note:
I would be very grateful if you could check all the questions are completed.
Please kindly return the completed questionnaire in 2 weeks either directly to us by using the paid and self-addressed attached or forward to the contact person in your organization.

If you are interested in this study, the summarized research results will be sent to you when the thesis is finished. Please leave your correspondences.

Appendix G Questionnaire (Chinese Version)

台灣壽險業採用與實施知識管理問卷調查表

親愛的先生/女士：您好！

爲了探討知識管理在台灣壽險業的運用，本問卷之設計乃是研究外在因素如何影響員工對知識管理的認知與看法，進而影響知識管理的採用與實施。

非常感激您能花約十五分鐘的時間，填寫此問卷。您的填答對本研究將相當寶貴，且問卷之答案無所謂對或錯，請您依實際感受回答即可。本問卷採不具名方式。回答問題為自願性質，回答問題者可以在沒有歧視或負面影響的情況之下，自由地在任何時間退出。所有回應僅供學術研究分析，亦僅限研究者本人與指導老師參考。研究結果將以整體方式呈現，絕不披露任何個人資料。本研究業經「科廷大學人文研究倫理委員會」核准，如果需要的話，可函 Curtin University Human Research Ethics Committee, Office of Research & Development, Curtin University of Technology, GPO Box U1987, Perth 6845, Western Australia，或致電+618 92662784 索取核准證明。

如果您有任何問題，請逕以 0920-104078 與本人連絡 (email: Li-Su.Huang@gsb.curtin.edu.au)；或指導教授－Professor Mohammed Quaddus, Graduate School of Business, Curtin University of Technology, 78 Murray Street, Perth 6000, Western Australia (電話：+618 92662862; email: Mohammed.Quaddus@gsb.curtin.edu.au)；或「研究倫理委員會」(秘書), Curtin University of Technology, 78 Murray Street, Perth 6000, Western Australia.

謝謝您，並敬祝　萬事如意

澳洲科廷大學商學研究所
指導教授: Professor Mohammed Quaddus
博士候選人: 黃麗夙　敬上

定義

依本研究目的，相關定義如下：

「知識」：個人根據本身經驗、技巧和能力對資訊所做的詮釋。知識在壽險業包括核保、理賠、保戶服務、產品等相關專業知識。

「知識管理」：收集、整理並使用個人和集體知識，使公司更具有競爭力。例如：經驗分享、建立知識庫等。

請就下列各題目所敘述的情況中，在題目適當的『□』內打∨，勾選一個最符合您現在的情況與感受。

第一部分：外在因素

一、您同意下列**「環境和產業因素」**會影響個人對知識管理的認識與看法嗎？

請您以 1~7 來表示您的同意程度，在適當的□內打∨。		極不同意			←→			極同意
		1	2	3	4	5	6	7
1.	壽險業的高度競爭。	□	□	□	□	□	□	□
2.	時代潮流和各產業對知識管理的重視。	□	□	□	□	□	□	□
3.	政府對壽險業嚴謹的法令規定。	□	□	□	□	□	□	□
4.	越來越多的保戶申訴和糾紛。	□	□	□	□	□	□	□
5.	台灣資訊科技產業的發達。	□	□	□	□	□	□	□
6.	壽險業涉及太多文件和紙張的大量使用。	□	□	□	□	□	□	□

二、您同意下列**「個人特性」**會影響個人對知識管理的認識與看法嗎？

請您以 1~7 來表示您的同意程度，在適當的□內打∨。		極不同意			←→			極同意
		1	2	3	4	5	6	7
1.	學歷。	□	□	□	□	□	□	□

2.	職位。	□	□	□	□	□	□	□
3.	工作領域(例如:例行事務工作或專業知識密集工作)。	□	□	□	□	□	□	□
4.	電腦背景和技巧。	□	□	□	□	□	□	□
5.	個人創新性(例如:樂意嘗試和接受改變)。	□	□	□	□	□	□	□
6.	工作態度。	□	□	□	□	□	□	□
7.	個性(例如：主動與被動；積極與保守)。	□	□	□	□	□	□	□
8.	使用電腦和網路的習慣(例如:每天使用電腦和網路的時間)。	□	□	□	□	□	□	□
9.	對公司的忠誠度和歸屬感。	□	□	□	□	□	□	□

三、您同意下列「**資訊科技支援**」會影響個人對知識管理的認識與看法嗎？

請您以 1~7 來表示您的同意程度，在適當的□內打∨。		極不同意			←→			極同意
		1	2	3	4	5	6	7
1.	硬體設施(例如：足夠的主機容量、頻寬和先進的設備，提供穩定快速的平台)。	□	□	□	□	□	□	□
2.	軟體設施(例如：規劃良好的系統和好用的軟體)。	□	□	□	□	□	□	□
3.	可提供正確和整合的資訊。	□	□	□	□	□	□	□
4.	可與實際作業相容。	□	□	□	□	□	□	□
5.	可根據需求提供多樣功能。	□	□	□	□	□	□	□
6.	電腦資料更新與維護。	□	□	□	□	□	□	□
7.	測試並加以適當調整。	□	□	□	□	□	□	□
8.	資料和系統的安全性。	□	□	□	□	□	□	□
9.	資訊部門人員和使用者的合作與溝通。	□	□	□	□	□	□	□
10.	好玩和有趣的設計(例如：遊戲)。	□	□	□	□	□	□	□

四、您同意下列有關公司對「**知識管理的推動**」會影響個人對知識管理的認識與看法嗎？

請您以 1~7 來表示您的同意程度，在適當的□內打∨。		極不同意			⟷			極同意
		1	2	3	4	5	6	7
1.	知識管理的負責人。	□	□	□	□	□	□	□
2.	知識管理的計畫或專案，包括預算和相關人員配置。	□	□	□	□	□	□	□
3.	知識管理的團隊。	□	□	□	□	□	□	□
4.	高階主管對知識管理的支持。	□	□	□	□	□	□	□
5.	人力和財力上的支持。	□	□	□	□	□	□	□
6.	傳達知識管理的使命和好處。	□	□	□	□	□	□	□
7.	時程表與指導方針。	□	□	□	□	□	□	□
8.	訓練，介紹知識管理的概念和提供所需的基本技能。	□	□	□	□	□	□	□
9.	各部門的代表能參與知識管理相關會議，有良好的表達和討論機會。	□	□	□	□	□	□	□
10.	時間和空間上的支持(例如：對推動知識管理的員工減少原有的工作量)。	□	□	□	□	□	□	□
11.	移轉知識的管道(例如：人與人之間直接溝通或以大眾傳播傳遞知識的方式)。	□	□	□	□	□	□	□
12.	知識的種類(例如：公司文件或個人經驗)。	□	□	□	□	□	□	□
13.	對知識管理的獎勵，包括金錢和精神上的獎勵(例如：獎金、獎牌或升遷)。	□	□	□	□	□	□	□
14.	對知識管理績效的評估(例如：比賽或排名)。	□	□	□	□	□	□	□

五、您同意下列有關公司的「**組織特性**」會影響個人對知識管理的認識與看法嗎？

請您以 1~7 來表示您的同意程度，在適當的□內打∨。		極不同意			⟷			極同意
		1	2	3	4	5	6	7
1.	組織大小。	□	□	□	□	□	□	□
2.	組織結構(例如：層級的多寡、權力集中或分散等)。	□	□	□	□	□	□	□
3.	組織願景、價值和目標。	□	□	□	□	□	□	□
4.	組織策略和政策。	□	□	□	□	□	□	□
5.	組織學習系統和環境。	□	□	□	□	□	□	□
6.	職務輪調和職務代理人制度。	□	□	□	□	□	□	□
7.	員工離職率。	□	□	□	□	□	□	□
8.	組織設立時間的長短(例如：剛設立公司或設立較久的公司)。	□	□	□	□	□	□	□
9.	公司所銷售產品的種類與多寡。	□	□	□	□	□	□	□

六、您同意下列「**文化因素**」會影響個人對知識管理的認識與看法嗎？

請您以 1~7 來表示您的同意程度，在適當的□內打∨。		極不同意			⟷			極同意
		1	2	3	4	5	6	7
1.	鼓勵對知識的追求、提供與分享。	□	□	□	□	□	□	□
2.	重視團隊的和諧與運作。	□	□	□	□	□	□	□
3.	強調信任和承諾的關係。	□	□	□	□	□	□	□
4.	尊重員工和客戶。	□	□	□	□	□	□	□
5.	鼓勵員工探究和嘗試新事物。	□	□	□	□	□	□	□
6.	鼓勵員工在有需要時尋求別人協助。	□	□	□	□	□	□	□
7	鼓勵員工和其他部門互動。	□	□	□	□	□	□	□

第二部份：知識管理的認知

一、下列敘述是有關知識管理可能「**增進工作績效的有用性**」：

★ 我認為知識管理在改善我的工作績效上有用，當它可以...

請您以 1~7 來表示您對該敘述的同意程度，在適當的□內打∨。		極不同意 ←→ 極同意						
		1	2	3	4	5	6	7
1.	改善我的工作和服務品質。	□	□	□	□	□	□	□
2.	提高我的工作產量。	□	□	□	□	□	□	□
3.	節省我的工作時間。	□	□	□	□	□	□	□
4.	讓工作變得有效率。	□	□	□	□	□	□	□
5.	讓工作變得比較容易。	□	□	□	□	□	□	□
6.	在工作上有更多便利和彈性(例如：可以隨時取得資訊)。	□	□	□	□	□	□	□
7.	符合工作上的需要，解決問題。	□	□	□	□	□	□	□
8.	讓我有效的收集、儲存、整理資料和傳承經驗給他人。	□	□	□	□	□	□	□
9.	增加我的專業能力。	□	□	□	□	□	□	□
10.	降低工作上可能犯的錯誤。	□	□	□	□	□	□	□
11.	減少一些不必要的重複工作。	□	□	□	□	□	□	□
12.	讓我學到一般書本很難學到的東西(例如：別人處理案件的經驗)。	□	□	□	□	□	□	□
13.	增加升遷或加薪的可能性。	□	□	□	□	□	□	□

二、下列敘述是有關知識管理的「**複雜度**」：

★ 我會覺得知識管理很難瞭解和實施，如果...

請您以 1~7 來表示您對該敘述的同意程度，在適當的□內打∨。		極不同意 ←→ 極同意						
		1	2	3	4	5	6	7
1.	相關的電腦資訊系統不好用。	□	□	□	□	□	□	□
2.	要花太多時間才找得到需要的資訊。	□	□	□	□	□	□	□
3.	訊息不夠簡單明確。	□	□	□	□	□	□	□

4.	問題發生時，沒有得到立即的協助。	□	□	□	□	□	□	□
5.	找不到真正要的資訊或知識。	□	□	□	□	□	□	□
6.	在實際作業上不容易操作。	□	□	□	□	□	□	□

三、下列敘述是有關個人在接受和實施知識管理時可能受到別人影響的「**主觀標準**」：

★ 我會接受和實施知識管理，因為(有)...

請您以 1~7 來表示您對該敘述的同意程度，在適當的□內打∨。		極不同意			⟷			極同意
		1	2	3	4	5	6	7
1.	來自同事或同業人員的壓力，認為我應該接受和實施知識管理。	□	□	□	□	□	□	□
2.	同事接受和實施知識管理的人數多寡，以及他們的評論。	□	□	□	□	□	□	□
3.	直屬主管的態度和看法。	□	□	□	□	□	□	□
4.	高級主管的鼓勵。	□	□	□	□	□	□	□
5.	團體中意見領袖的影響。	□	□	□	□	□	□	□
6.	公司規定要求員工應接受和實施知識管理。	□	□	□	□	□	□	□
7.	接受和實施知識管理可以提升個人在公司的形象、聲望和地位。	□	□	□	□	□	□	□

第三部份：對知識管理的態度

一、下列敘述是請教有關您「**對知識管理的態度**」：

請您以 1~7 來表示您對該敘述的同意程度，在適當的□內打∨。		極不同意			⟷			極同意
		1	2	3	4	5	6	7
1.	知識管理是好的主意。	□	□	□	□	□	□	□
2.	知識管理使工作變得更有趣。	□	□	□	□	□	□	□
3.	知識管理很好玩。	□	□	□	□	□	□	□
4.	我喜歡知識管理。	□	□	□	□	□	□	□

第四部份：知識管理的實施

一、下列敘述是請教有關在　貴公司內「**知識管理的實施**」情形：

以下有關知識管理實施的敘述，請您以 1~7 來表示其發生的經常程度，在適當的□內打∨。		極不經常 ←→ 極經常						
		1	2	3	4	5	6	7
1.	我們會從各種不同來源收集知識。	□	□	□	□	□	□	□
2.	我們可辨認出重要和有用的知識。	□	□	□	□	□	□	□
3.	我們會整理知識，並將所收集的知識予以分類和整合。	□	□	□	□	□	□	□
4.	我們會分享知識給別人。	□	□	□	□	□	□	□
5.	我們會吸收並轉化別人的知識，成為自己的知識和技能。	□	□	□	□	□	□	□
6.	我們會將知識運用在實際工作中。	□	□	□	□	□	□	□
7.	知識管理成為我們日常工作的一部分。	□	□	□	□	□	□	□

第五部份：預期績效

一、下列敘述是有關實施知識管理可能爲公司所帶來的「**預期績效**」**:**

★ 我認為實施知識管理能夠...，提昇公司的績效。

請您以 1~7 來表示您對該敘述的同意程度，在適當的□內打∨。		極不同意 ←→ 極同意						
		1	2	3	4	5	6	7
1.	提供正確且快速的回應，改善對客戶的服務。	□	□	□	□	□	□	□
2.	提高作業效率。	□	□	□	□	□	□	□
3.	降低成本(例如節省人力、紙張和空間的使用)。	□	□	□	□	□	□	□
4.	對改變有更好的適應能力。	□	□	□	□	□	□	□
5.	獲得較好的聲譽和口碑。	□	□	□	□	□	□	□

6.	改善員工素質。	□	□	□	□	□	□	□
7.	提供管理者在決策上更多的資訊。	□	□	□	□	□	□	□
8.	使員工的工作經驗和知識留存在公司。	□	□	□	□	□	□	□
9.	降低員工離職對公司造成的衝擊和可能的損失。	□	□	□	□	□	□	□

基本資料：(請您在適當的□內打∨)

1. 請問您在　貴公司服務大約有多久？

□ 2 年(含)以下　□ 2 年以上至 5 年　□ 5 年以上至 10 年

□ 10 年以上至 15 年　□ 15 年以上

2. 性別：

□ 男　□ 女

3. 年齡：

□ 20 歲(含)以下　□ 21-30 歲　□ 31-40 歲　□ 41-50 歲　□ 51 歲(含)以上

4. 職位：

□ 副總經理或以上　□ 協理　□ (室)主任　□ 部門經理

□ 副理　□ 襄理　□ 課長　□ (組)組長/主任

□ 職員　□ 其他：

5. 最主要工作：

□ 核保　□ 理賠　□ 展業行銷　□ 保戶服務

□ 保單服務(保單變更、保單貸款和解約等)　□ 保費(收繳與帳務)

□ 教育訓練　□ 資訊科技　□ 會計與財務投資　□ 精算與保單研發

□ 人力資源　□ 法務　□ 文書總務　□ 其他: _____

6. 教育程度：

□ 高中職　□ 專科　□ 大學　□ 碩士或以上

本問卷到此全部結束，非常感謝您的協助。

附註：

很感激您能再次檢查是否已經填答所有問題。

懇請您將填妥問卷轉交給　貴公司相關聯絡人員以所附回郵信封儘在兩週內寄回。

如果您對本研究有興趣，請留下您的聯繫方式，論文完成時，將爲您儘速寄上研究結果摘要。

Appendix H PLS Bootstrapping Output

Output results with Construct Level sign change preprocessing:

Bootstrap raw data generated for Prof Mohammed "Quaddus," PhD

Number of cases in full model: 362

Number of cases per sample: 362

Number of samples generated: 100

Number of good samples: 100

Outer Model Weights:

		Original sample estimate	Mean of subsamples	Standard error	T-Statistic
EI	:				
	EI1	0.3338	0.3105	0.1036	3.2225
	EI2	0.1879	0.2061	0.0935	2.0102
	EI3	0.2528	0.247	0.0954	2.6491
	EI4	0.2955	0.2823	0.1065	2.7755
	EI5	0.2688	0.2844	0.0932	2.8844
	EI6	0.0169	0.0029	0.0897	0.1884
IN	:				
	IN3	0.3445	0.3449	0.027	12.7557
	IN5	0.2855	0.2858	0.023	12.3976

	IN6	0.3305	0.3378	0.02	16.5659
	IN7	0.3116	0.3094	0.0179	17.4085
IT	:				
	IT1	0.2109	0.2218	0.1243	1.6963
	IT2	0.0273	-0.0056	0.1441	0.1895
	IT3	0.0906	0.1097	0.1522	0.5953
	IT4	0.4243	0.4215	0.1538	2.7595
	IT5	0.1261	0.1107	0.1221	1.033
	IT6	0.0719	0.0739	0.1166	0.6167
	IT7	0.0587	0.0348	0.121	0.4851
	IT8	-0.0192	-0.0098	0.114	0.1685
	IT9	0.1586	0.1695	0.1214	1.3067
	IT10	0.0209	0.0117	0.0677	0.3086
KM	:				
	KM1	0.0889	0.0899	0.0061	14.6213
	KM2	0.0982	0.0981	0.0054	18.2712
	KM3	0.0943	0.0957	0.005	18.9396
	KM4	0.0996	0.1003	0.0051	19.613
	KM5	0.0907	0.0903	0.006	15.0311
	KM6	0.0936	0.0934	0.0052	17.8314
	KM7	0.0962	0.0959	0.0061	15.6971
	KM8	0.1034	0.1025	0.0052	19.9675
	KM9	0.0937	0.0926	0.0048	19.5683
	KM10	0.1069	0.1068	0.0059	18.1538
	KM11	0.1069	0.1069	0.006	17.9321
	KM12	0.1072	0.106	0.0052	20.5433
	KM13	0.0896	0.0885	0.0053	16.8828
OR	:				
	OR2	0.1863	0.1866	0.0133	14.0001
	OR3	0.23	0.2291	0.0106	21.6429

	OR4	0.22	0.2206	0.011	19.9941
	OR5	0.2493	0.2476	0.0147	16.9605
	OR6	0.2044	0.2019	0.0135	15.189
	OR7	0.1553	0.1549	0.0163	9.5279
CU	:				
	CU1	0.1807	0.1798	0.0094	19.1881
	CU2	0.1702	0.1707	0.0075	22.8372
	CU3	0.1662	0.1671	0.0084	19.6931
	CU4	0.162	0.1625	0.0073	22.2588
	CU5	0.1688	0.1678	0.0071	23.6579
	CU6	0.1736	0.1728	0.0083	20.815
	CU7	0.1615	0.1599	0.0085	18.9037
PU	:				
	PU1	0.1095	0.1089	0.0037	29.66
	PU2	0.0959	0.0959	0.0045	21.4466
	PU3	0.0966	0.0967	0.0037	26.0593
	PU4	0.0987	0.0992	0.0037	26.378
	PU5	0.0979	0.0974	0.0035	27.9249
	PU6	0.0968	0.0969	0.0031	31.1761
	PU7	0.1057	0.1054	0.0044	24.1323
	PU8	0.1049	0.1044	0.0045	23.4746
	PU9	0.1072	0.1061	0.0045	23.6735
	PU10	0.0968	0.0964	0.0034	28.5691
	PU11	0.0984	0.0985	0.0038	25.8459
	PU12	0.0951	0.0945	0.0038	25.155
CM	:				
	CM1	0.1979	0.1972	0.0093	21.2023
	CM2	0.1828	0.1827	0.0105	17.4632
	CM3	0.1839	0.184	0.0086	21.2715
	CM4	0.1892	0.1893	0.0075	25.16

	CM5	0.1862	0.187	0.0101	18.4792
	CM6	0.1768	0.1771	0.0099	17.9349
SN	:				
	SN1	0.1488	0.1462	0.0188	7.9354
	SN2	0.1561	0.1571	0.0183	8.5195
	SN3	0.1495	0.1529	0.0148	10.1114
	SN4	0.1952	0.195	0.0155	12.5599
	SN5	0.2221	0.2204	0.021	10.5606
	SN6	0.177	0.1782	0.0209	8.4502
	SN7	0.2214	0.2184	0.0202	10.9585
AT	:				
	AT1	0.3395	0.3379	0.0137	24.8076
	AT2	0.2888	0.2888	0.0079	36.4775
	AT3	0.2389	0.2406	0.0103	23.1451
	AT4	0.2987	0.2986	0.0102	29.3196
KP	:				
	KP1	0.158	0.1588	0.0066	23.8954
	KP2	0.1691	0.1694	0.0057	29.909
	KP3	0.1637	0.1647	0.0062	26.5099
	KP4	0.1641	0.1634	0.0068	24.2717
	KP5	0.1592	0.1583	0.0051	30.9986
	KP6	0.1718	0.1721	0.006	28.5157
	KP7	0.1611	0.1602	0.0061	26.2754
PEP	:				
	PEP1	0.1404	0.1403	0.0053	26.4165
	PEP2	0.1364	0.1362	0.0051	26.6193
	PEP3	0.1186	0.1185	0.0067	17.6478
	PEP4	0.1492	0.1486	0.005	30.0121
	PEP5	0.1271	0.1266	0.0059	21.4805

PEP6	0.1286	0.1286	0.006	21.2881
PEP7	0.1377	0.1373	0.0059	23.4269
PEP8	0.1315	0.1319	0.0064	20.6137
PEP9	0.1229	0.1237	0.007	17.683

==========

Outer Model Loadings:

==========

	Original sample estimate	Mean of subsamples	Standard error	T-Statistic
EI :				
(Composite Reliability = 0.85 "," AVE= 0.492)				
EI1	0.8013	0.784	0.0559	14.3275
EI2	0.7499	0.7478	0.0511	14.6851
EI3	0.722	0.7049	0.0605	11.9288
EI4	0.7146	0.6886	0.0696	10.2688
EI5	0.7073	0.7121	0.0627	11.2835
EI6	0.464	0.4498	0.0854	5.4336
IN :				
(Composite Reliability = 0.866 "," AVE= 0.619)				
IN3	0.7467	0.7412	0.0304	24.589
IN5	0.7411	0.7332	0.0362	20.4585
IN6	0.8263	0.8247	0.0243	34.0527
IN7	0.8282	0.8255	0.0241	34.3959
IT :				
(Composite Reliability = 0.941 "," AVE= 0.624)				
IT1	0.8115	0.7956	0.0554	14.6586

IT2	0.8437	0.8238	0.0481	17.5299
IT3	0.8719	0.8598	0.0434	20.0948
IT4	0.9315	0.9128	0.0302	30.8563
IT5	0.8588	0.8355	0.0414	20.7459
IT6	0.8121	0.7925	0.0392	20.6925
IT7	0.7886	0.7645	0.0466	16.9194
IT8	0.7137	0.6999	0.0602	11.8527
IT9	0.7973	0.7835	0.0522	15.2625
IT10	0.2847	0.2697	0.0858	3.3163

KM :

(Composite Reliability = 0.955 "," AVE= 0.619)

KM1	0.7261	0.7313	0.0377	19.2777
KM2	0.7738	0.7787	0.0312	24.7931
KM3	0.7761	0.7829	0.0294	26.4147
KM4	0.7859	0.7927	0.0267	29.4073
KM5	0.7789	0.7795	0.0258	30.2451
KM6	0.8047	0.804	0.0222	36.1996
KM7	0.7999	0.7993	0.0186	42.976
KM8	0.8442	0.8451	0.0163	51.7194
KM9	0.7844	0.7844	0.0268	29.2611
KM10	0.8071	0.8096	0.0235	34.4043
KM11	0.8366	0.8364	0.0202	41.4661
KM12	0.8064	0.8025	0.022	36.7041
KM13	0.6925	0.6886	0.0372	18.6137

OR :

(Composite Reliability = 0.912 "," AVE= 0.635)

OR2	0.7192	0.7256	0.0363	19.8119
OR3	0.8763	0.8758	0.0142	61.7173
OR4	0.8775	0.8775	0.0171	51.4462
OR5	0.8385	0.8404	0.0212	39.4787
OR6	0.7571	0.7593	0.0229	33.0635

OR7	0.6936	0.6989	0.0341	20.3273

CU :

(Composite Reliability = 0.946 "," AVE= 0.716)

CU1	0.7841	0.7862	0.0277	28.2978
CU2	0.871	0.875	0.0168	51.7867
CU3	0.8345	0.8362	0.019	43.9127
CU4	0.8426	0.8474	0.0172	49.0391
CU5	0.8544	0.8536	0.0226	37.7555
CU6	0.8831	0.884	0.0163	54.3121
CU7	0.8497	0.8486	0.0179	47.3887

PU :

(Composite Reliability = 0.964 "," AVE= 0.69)

PU1	0.8567	0.857	0.0195	43.9046
PU2	0.7798	0.7829	0.0313	24.9493
PU3	0.8682	0.8695	0.0195	44.4824
PU4	0.8551	0.8609	0.0228	37.4812
PU5	0.8384	0.8381	0.0248	33.7733
PU6	0.8381	0.8406	0.0224	37.3716
PU7	0.8636	0.8642	0.0178	48.435
PU8	0.8348	0.8363	0.0165	50.671
PU9	0.8106	0.8102	0.0224	36.1427
PU10	0.8282	0.8301	0.0185	44.6847
PU11	0.8197	0.8233	0.0221	37.0464
PU12	0.7716	0.7748	0.0238	32.4681

CM :

(Composite Reliability = 0.96 "," AVE= 0.802)

CM1	0.896	0.8958	0.0128	69.9843
CM2	0.9019	0.9021	0.0142	63.4524
CM3	0.9088	0.9086	0.0127	71.3709
CM4	0.8879	0.8875	0.0146	60.8873

CM5	0.9034	0.904	0.0135	66.7502
CM6	0.8739	0.8713	0.0172	50.7685

SN :

(Composite Reliability = 0.92 "," AVE= 0.623)

SN1	0.7651	0.7644	0.033	23.1957
SN2	0.757	0.7571	0.0346	21.8477
SN3	0.8378	0.8361	0.0252	33.2066
SN4	0.8154	0.8155	0.0267	30.5359
SN5	0.8088	0.8118	0.0282	28.6825
SN6	0.8139	0.8134	0.0222	36.6826
SN7	0.7225	0.7213	0.0353	20.4908

AT :

(Composite Reliability = 0.918 "," AVE= 0.736)

AT1	0.8277	0.8251	0.0188	44.0035
AT2	0.8967	0.897	0.0134	66.97
AT3	0.8251	0.8267	0.0249	33.1046
AT4	0.8805	0.8808	0.0119	74.2117

KP :

(Composite Reliability = 0.957 "," AVE= 0.76)

KP1	0.8499	0.8485	0.0214	39.7251
KP2	0.8871	0.8872	0.0133	66.6081
KP3	0.8761	0.8767	0.0137	63.9853
KP4	0.8501	0.8484	0.0204	41.6156
KP5	0.8826	0.882	0.0182	48.4246
KP6	0.9013	0.903	0.0135	66.9328
KP7	0.8528	0.8538	0.0204	41.8048

PEP :

(Composite Reliability = 0.955 "," AVE= 0.701)

PEP1	0.878	0.8795	0.0127	68.8744

PEP2	0.8733	0.8744	0.0168	51.9119
PEP3	0.7809	0.7804	0.0333	23.4751
PEP4	0.8903	0.8907	0.0128	69.4957
PEP5	0.83	0.8304	0.0208	39.9541
PEP6	0.8406	0.8391	0.0219	38.4607
PEP7	0.8304	0.8316	0.0187	44.507
PEP8	0.8278	0.8271	0.0183	45.1273
PEP9	0.7765	0.7774	0.0253	30.6767

==========

Path Coefficients Table (Original Sample Estimate):

==========

	EI	IN	IT	KM	OR	CU	PU	CM	SN	AT	KP	PEP
EI	0	0	0	0	0	0	0	0	0	0	0	0
IN	0	0	0	0	0	0	0	0	0	0	0	0
IT	0	0	0	0	0	0	0	0	0	0	0	0
KM	0	0	0	0	0	0	0	0	0	0	0	0
OR	0	0	0	0	0	0	0	0	0	0	0	0
CU	0	0	0	0	0	0	0	0	0	0	0	0
PU	0.08	0.065	0.084	0.346	0.099	0.181	0	0.127	0	0	0	0
CM	0	0.138	0.221	0.07	0.164	0	0	0	0	0	0	0
SN	0	0	0	0	0	0.41	0	0	0	0	0	0
AT	0	0.167	0	0	0	0	0.513	-0.013	0.146	0	0	0
KP	0	0	0	0	0	0	0	0	0	0.587	0	0
PEP	0	0	0	0	0	0	0	0	0	0	0.722	0

==========

Path Coefficients Table (Mean of Subsamples):

	EI	IN	IT	KM	OR	CU	PU	CM	SN	AT	KP	PEP
EI	0	0	0	0	0	0	0	0	0	0	0	0
IN	0	0	0	0	0	0	0	0	0	0	0	0
IT	0	0	0	0	0	0	0	0	0	0	0	0
KM	0	0	0	0	0	0	0	0	0	0	0	0
OR	0	0	0	0	0	0	0	0	0	0	0	0
CU	0	0	0	0	0	0	0	0	0	0	0	0
PU	0.0903	0.0572	0.099	0.347	0.0875	0.1804	0	0.1201	0	0	0	0
CM	0	0.1332	0.2318	0.0756	0.1542	0	0	0	0	0	0	0
SN	0	0	0	0	0	0.4213	0	0	0	0	0	0
AT	0	0.1595	0	0	0	0	0.5124	-0.0124	0.1565	0	0	0
KP	0	0	0	0	0	0	0	0	0	0.5894	0	0
PEP	0	0	0	0	0	0	0	0	0	0	0.7226	0

Path Coefficients Table (Standard Error):

	EI	IN	IT	KM	OR	CU	PU	CM	SN	AT	KP	PEP
EI	0	0	0	0	0	0	0	0	0	0	0	0
IN	0	0	0	0	0	0	0	0	0	0	0	0
IT	0	0	0	0	0	0	0	0	0	0	0	0

KM	0	0	0	0	0	0	0	0	0	0	0	0
OR	0	0	0	0	0	0	0	0	0	0	0	0
CU	0	0	0	0	0	0	0	0	0	0	0	0
PU	0.0469	0.0492	0.0517	0.0763	0.0644	0.0614	0	0.0436	0	0	0	0
CM	0	0.0694	0.0673	0.0721	0.0818	0	0	0	0	0	0	0
SN	0	0	0	0	0	0.049	0	0	0	0	0	0
AT	0	0.0492	0	0	0	0	0.0494	0.0544	0.0612	0	0	0
KP	0	0	0	0	0	0	0	0	0	0.0424	0	0
PEP	0	0	0	0	0	0	0	0	0	0	0.0355	0

Path Coefficients Table (T-Statistic)

	EI	IN	IT	KM	OR	CU	PU	CM	SN	AT	KP	PEP
EI	0	0	0	0	0	0	0	0	0	0	0	0
IN	0	0	0	0	0	0	0	0	0	0	0	0
IT	0	0	0	0	0	0	0	0	0	0	0	0
KM	0	0	0	0	0	0	0	0	0	0	0	0
OR	0	0	0	0	0	0	0	0	0	0	0	0
CU	0	0	0	0	0	0	0	0	0	0	0	0
PU	1.7074	1.3219	1.6254	4.5362	1.5364	2.9466	0	2.913	0	0	0	0
CM	0	1.9889	3.2832	0.971	2.0046	0	0	0	0	0	0	0
SN	0	0	0	0	0	8.3683	0	0	0	0	0	0
AT	0	3.3978	0	0	0	0	10.3862	0.2389	2.3858	0	0	0

	0											
KP	0	0	0	0	0	0	0	0	0	13.8286	0	0
PEP	0	0	0	0	0	0	0	0	0	0	20.3407	0